

This Troubleshooting and Repair Manual is valid for the following heater models:

Standard Model

	Cat. No.	Basic Heater No.
HYDRONIC 16 - 24 V	25 2165 02 00 00	25 2165 01 00 00
HYDRONIC 24 - 24 V	25 1817 02 00 00	25 1817 01 00 00
HYDRONIC 30 - 24 V	25 1818 02 00 00	25 1818 01 00 00
HYDRONIC 35 - 24 V	25 1819 02 00 00	25 1819 01 00 00

Compact Model

	Cat. No.	Basic Heater No.
HYDRONIC 24 - 24 V	25 1817 05 00 00	25 1817 01 00 00
HYDRONIC 30 - 24 V	25 1818 05 00 00	25 1818 01 00 00
HYDRONIC 35 - 24 V	25 2041 05 00 00	25 1819 01 00 00



Compact Model



Standard Model

1 / Introduction

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1 / Introduction

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1 / Introduction

Special notation, pictures and pictograms

This document uses special notation and pictograms to give emphasis to different types of information. Their meaning and how you should respond to them are explained in the examples below.

Special notation and pictures

A bullet symbol (•) is used to indicate a list which is introduced by a heading.

If an indented dash (-) occurs after a bullet point, then this list is subordinate to the main bullet list.

Pictograms

Regulation

This pictogram, accompanied by the caption "Regulation", indicates a statutory requirement.

Failure to comply with this regulation will cause the General Type Approval for the *HYDRONIC* to lapse and invalidate the warranty and any liability on the part of J. Eberspächer GmbH & Co.

Danger!

This pictogram, accompanied by the caption "Danger", draws your attention to an imminent danger to life and limb. Failure to observe this instruction could result in serious injury.

Important!

This pictogram, accompanied by the caption "Important!", draws your attention to a situation which is potentially dangerous to a person and / or the product. Failure to observe this instruction could result in physical injury and / or damage to the equipment.

Please note!

This instruction provides recommendations for use and helpful tips regarding the installation and / or repair of the *HYDRONIC*.

Liability claims / warranty

Adherence to the official regulations and the safety instructions is essential if any liability claims are to be accepted.

Failure to observe the official regulations and the safety instructions will result in exemption of the heater manufacturer from liability.

Accident prevention

The general Accident Prevention Regulations and the corresponding plant and operational protective instructions must be observed.



1 / Introduction

Important information prior to commencing work

Applications in which the *HYDRONIC* may be used

The engine-independent “*HYDRONIC* 16 / 24 / 30 / 35” water heaters are intended for installation in the following vehicles (in each case, the heater output should be appropriate to the application):

- motor vehicles, especially buses
- building machinery
- trailers
- ships and yachts



Important!

- The heater may only be used and operated for the applications specified by the manufacturer and in compliance with the enclosed “Operating Instructions” for the heater concerned.
- Installation of the *HYDRONIC* in vehicles that are used to transport dangerous goods within the provisions of GGVS / TRS 003, ADR / ADR99 is not permitted.

Intended use of the *HYDRONIC*

- preheating, de-icing of windows
- heating and maintaining the heated temperature of:
 - drivers' cabs and work cubicles
 - cargo areas
 - ships' cabins
 - travel compartments for passengers and crew
 - vehicle engines and assemblies

On the basis of its functional specifications, the *HYDRONIC* is not approved for use in the following applications:

- long-term sustained operations, e.g. to pre-heat and heat
 - living rooms
 - garages
 - work enclosures, weekend homes and hunting lodges
 - houseboats and similar.

Initial operation of the *HYDRONIC* and functional testing following a repair

- Following installation or repair of the *HYDRONIC*, it is necessary to carefully bleed the coolant circuit and the entire fuel supply system. When doing so, the instructions issued by the vehicle manufacturer must be observed.
- Prior to test running, open all heating circuits (set the temperature controller to “HOT”).
- During test running of the *HYDRONIC*, check all water and fuel connections to ensure that they are leakproof and securely in position.
- If during operation the *HYDRONIC* should develop a fault, then identify the cause of the fault using a diagnostic facility and rectify.

Content and purpose of this documentation

The Technical Description, Troubleshooting and Repair Manual is valid for the heaters listed on the front page and contains all the necessary technical information.

- The Technical Description is contained on pages 4 to 23. The Technical Description describes the correct installation of the *HYDRONIC* in compliance with the relevant regulations.
- The Troubleshooting and Repair Manual is contained on pages 24 to 47. The Troubleshooting and Repair Manual describes the troubleshooting procedures and the repair work that is permitted on the *HYDRONIC*.

Additional documentation on the *HYDRONIC*

Operating Instructions

The Operating Instructions provide customers with the information that is necessary for safe handling and use of the *HYDRONIC*.





Spare Parts List

The Spare Parts List provides Eberspächer service partners with the information they need to order spare parts for repair purposes.

1 / Introduction

Statutory requirements

To install the heater in a vehicle subject to the German regulations governing the registration of motor vehicles (StVZO), a "General Type Approval" has to be issued by the Federal Motor Vehicle Office (Kraftfahrtbundesamt) and the appropriate official test symbol must be indicated on the heater rating plate.

HYDRONIC 16	S		329
HYDRONIC 24	S		297
HYDRONIC 30	S		295
HYDRONIC 35	S		296

The statutory requirements are binding for applications which fall within the scope of the StVZO (regulations governing the registration of motor vehicles) and should also be adhered to in countries in which there are no specific regulations.

Where heaters are installed in vehicles that are not subject to the StVZO (e.g. ships) the directions and installation instructions which apply specifically to those cases must be observed.

Directions regarding installation and repair

- Installation of heaters must comply with the Installation Instructions. In the following cases,
 - a) vehicle type test under §20 StVZO
 - b) individual test under §21 StVZO or
 - c) examination under §19 StVZO,
 - the heater must be checked by an officially certified expert or tester of motor vehicles, a motor vehicle expert or employee in accordance with Section 7.4 a of the Annex to the StVZO,
 - and in case c) this must be certified with details of the vehicle manufacturer, vehicle type and vehicle identification number on the Final Approval Certificate contained in the copy of the General Type Approval.
 - The validity of the Type Approval depends on this.
 - The Final Approval Certificate must be kept in the vehicle.
- Where the heater is installed in a special-purpose vehicle (e.g. a vehicle for transporting hazardous goods), the installation must comply with the regulations applicable to such vehicles.
- Installation in the driver's cab or passenger compartment of buses containing more than eight seats in addition to the driver's seat is not permitted.
- The instruction sticker, "**Switch off heater before filling up**" contained in the Scope of Supply for the heater, must be displayed in a prominent position in the vehicle (near to the fuel filler connection).

Directions for operation

- The heater must be switched off during refuelling.
- Operation of the heater in an enclosed space is not permitted, e.g.
 - garages
 - underground car parks
 - multi-storey car parks

Please note!

- All other installation requirements related to the General Type Approval are printed in the relevant sections of these Installation Instructions.
- The Final Approval Certificate is contained in the Operating Instructions.



1 / Introduction

Safety instructions for installation and repair of the *HYDRONIC*

Danger of injury, fire and poisoning!

- Disconnect the vehicle battery prior to starting work.
- Prior to starting any repair work, switch off the *HYDRONIC* and allow all hot components to cool down.

Important!

- The heater may only be installed or, in the case of repair or work under guarantee, repaired by an Eberspächer service partner authorised by the manufacturer and in accordance with the directions contained in this documentation or any special installation suggestions.
- Repairs by non-authorised third parties and / or using non-genuine spare parts are dangerous and are therefore not permitted. They will result, moreover, in lapse of the General Type Approval of the heater and, in the case of motor vehicles, possibly of the General Operating Permit for the vehicle as well.
- The following measures are not permitted:
 - modification of heater-relevant components,
 - use of non-original parts which have not been approved by the Eberspächer company,
 - departures from legal, safety and / or function-relevant directions contained in the Installation Instructions and the Operating Instructions, either in the installation or operation of the heater.

This applies in particular to the electrical wiring (wiring diagrams), the fuel supply, the combustion air and exhaust gas piping.

- Only original accessories and spare parts may be used during installation or repair.
- The *HYDRONIC* may only be operated using control elements approved by the Eberspächer company. Use of other control elements can lead to malfunctioning of the heater / heating operation.
- Prior to reinstalling a heater in a different vehicle, the water-carrying parts of the heater must be rinsed with clear water.

Safety instructions for operation

Important!

- Operation of the heater is not permitted where flammable vapours or dust could build up, for example in the vicinity of
 - fuel depots
 - coal stores
 - timber stores
 - stores of grain and similar.
- The delayed shutoff of the *HYDRONIC* must not be terminated prematurely, e.g. through activation of the battery isolating switch, except in case of emergency cutout.

Emergency cutout - emergency circuit breaker

If an emergency cutout - emergency circuit breaker - should be necessary during operation, the following procedure should be followed:

- switch off *HYDRONIC* on the control element
 - or
- take out the fuse
 - or
- open the battery isolating switch
 - or
- disconnect the *HYDRONIC* from the battery

2 / Product Information

Cat. No. **HYDRONIC** and additional equipment

Fig. No. / Designation
Cat. No.

1	HYDRONIC 16 - 24 V	25 2165 02 00 00
1	HYDRONIC 24 - 24 V	25 1817 02 00 00
2	HYDRONIC 24 - 24 V Compact model	25 1817 05 00 00
1	HYDRONIC 30 - 24 V	25 1818 02 00 00
2	HYDRONIC 30 - 24 V Compact model	25 1818 05 00 00
1	HYDRONIC 35 - 24 V	25 1819 02 00 00
2	HYDRONIC 35 - 24 V Compact model	25 2041 05 00 00

Additional equipment which has to be ordered separately

3	"Bus 2000" water pump	25 1818 25 00 00
4	Water pump, 5000 l/h	25 1578 25 00 00
5	Hose clip, dia. 40 mm - 47 mm	152 00 158
6	Hose bend 38 mm dia.	360 00 300
7	Connecting pipe 38 mm dia.	25 1214 89 00 21
8	T-piece 38-38-38 mm dia.	25 1371 89 04 00
9	Reducing piece, 38/28 mm dia.	25 1214 89 00 19
10	Hose clip, dia. 32mm - 39 mm	152 61 097
11	Pipe bend, 38 mm dia.	25 1214 89 00 03
12	Water hose 38 mm dia.	360 75 096
13	Exhaust pipe connection 70 mm dia.	25 2025 89 01 00
14	Exhaust pipe connection 70 mm dia.	22 1000 40 04 00
15	Exhaust pipe bend 70 mm dia.	22 1000 40 03 00
16	Fuel filter	330 00 052
17	Hollow screw, M 14 x 15	104 10 040
18	Seal ring, A 14 x 18	323 16 006
19	Fuel intake pipe	25 1698 05 03 00
20	Screw coupling, M14 x 1,5	266 42 004
21	Spherical bush	263 35 080
22	Cap nut, M 14 x 15	116 10 040
23	Fuel pipe dia. 6 x 1 mm (copper), per metre	080 16 003
24	Fuel hose dia. 5 x 3 mm	360 75 350
25	Hose clip 11 mm dia.	10 2063 01 10 98
26	Screw coupling, M 14 x 1.5	25 1706 05 01 00
27	Ball valve, M 14 x 1.5	330 00 019
28	Fuel return line	25 1698 05 04 00
29	Valve	330 00 210
30	Reducing joint 8/6 mm	266 00 026
31	Hood with hose connection	22 1000 40 06 00
32	1 m flexible hose, 60 mm dia.	10 2114 31 00 00
33	Hose clip	10 2064 05 00 70
34	Air hose fastening set	22 1000 50 02 00
35	Grille plastic	25 1688 80 06 00

Cat. No. Control element, optional

Quantity / Designation Cat. No.

1 Universal switch 25 1380 89 04 00
ON / OFF switch



Additionally required:
1 electric bulb

207 00 006

1 Mini-timer 12 / 24 V 22 1000 31 31 00



The mini-timer can be combined
with the TP 41i radio remote control.

1 Modular timer -12 / 24 V 22 1000 30 34 00



The modular timer can be combined
with the TP 41i radio remote control.

1 „Modular timer“ fasteners 25 1482 70 01 00
Only required where heater
is installed with trim panel

1 Radio remote control TP 4i 22 1000 30 99 00
12 / 24 V



The TP 4i radio remote control can only be used
in combination with the modular timer.

1 Radio remote control TP 41i 22 1000 31 39 00
12 / 24 V



The TP 41i radio remote control can be used
both independently and also in combination
with the mini-timer.
(Cat. No. of the mini-timer - 22 1000 31 31 00)

Please note!

Choice of control elements must be appropriate to
the purpose for which the **HYDRONIC** is to be used.

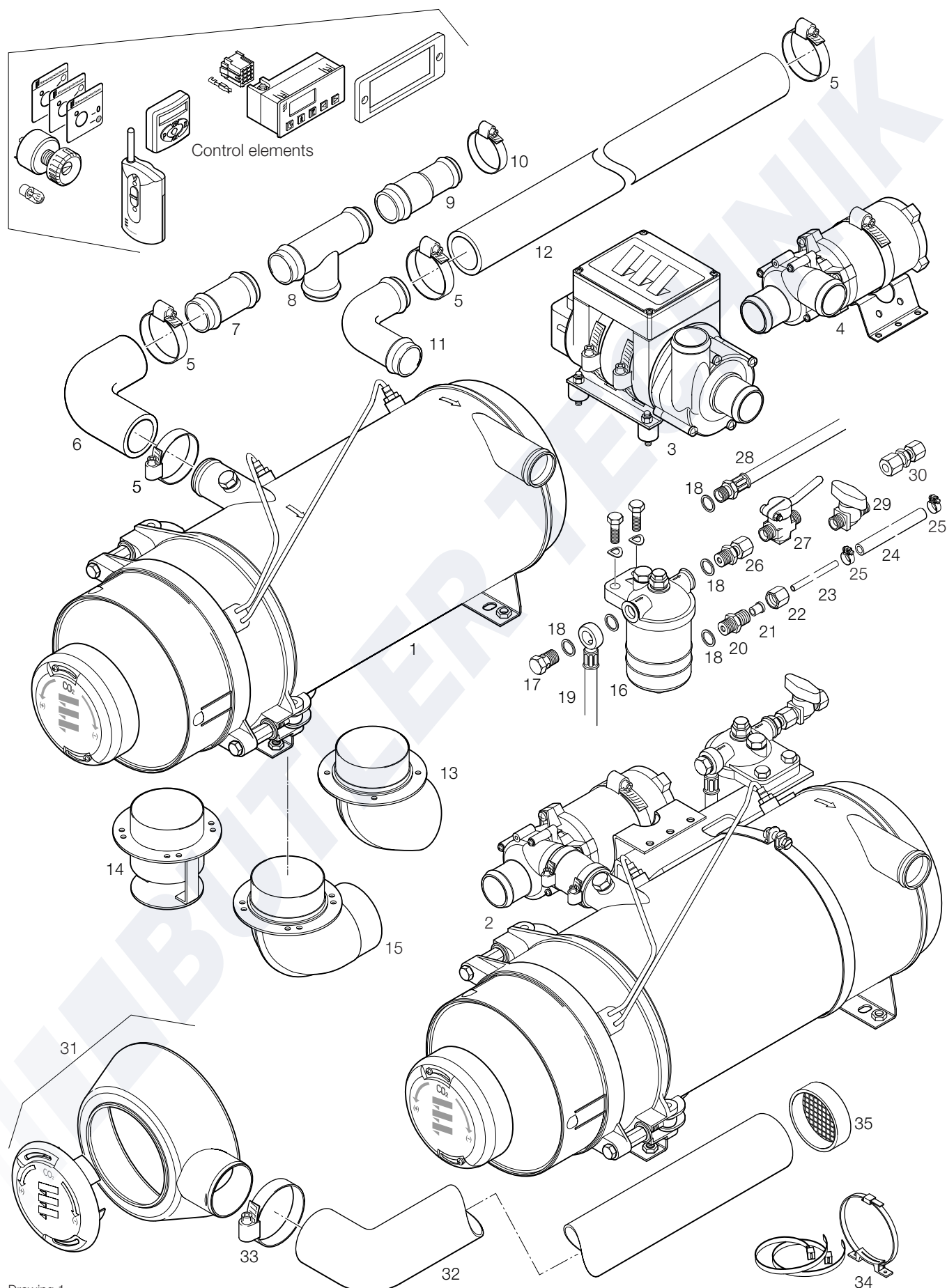
Selection criteria:

- switching on / off
- program preselection and / or remote control

Operating Instructions are enclosed with the control
elements. These are intended for the customer along
with the Operating Instructions for the **HYDRONIC**.

For other additional equipment, see Additional Equipment
Catalogue.

2 / Product Information



Drawing 1

2 / Product Information

Construction of the *HYDRONIC*

The *HYDRONIC* consists of a heat exchanger and a removable burner.

The heat exchanger is a combustion chamber, consisting of a flame pipe with integrated mixer.

If required, the flame pipe can be removed from the heat exchanger.

The control unit and electric motor are attached under the burner hood on the burner flange.

The fuel pump forms an integral part of the burner casing.

To operate the *HYDRONIC*, the following additional equipment is required:

- water pump
- parts for connecting to the water circulation system
- additional equipment for the fuel supply
- additional equipment for the exhaust gas piping
- control element

For catalogue numbers of the additional equipment, see pages 8 and 9.

For other additional equipment, see Additional Equipment Catalogue.

Special features of the *HYDRONIC*

- If the water flow rate is insufficient, the water outlet temperature is limited by early correction.
- The temperature rise of the heating medium is monitored by time.
If the temperature rises too quickly (because the water flow rate is insufficient), the heater will automatically switch itself off and the delayed shutoff will commence, following which the cycle starts up again.
- The values of the temperature sensor and the safety thermal cutout sensor are continuously compared, resulting in improved safety since, if the difference in the values is too great (because the water flow rate is insufficient), a fault shutdown will occur.

Function description

Switching on the *HYDRONIC*

When the *HYDRONIC* is switched on, a component test lasting 3 seconds is carried out, following which the water pump is started up.

Note:

If the water temperature is $<5^{\circ}\text{C}$, the nozzle holder heater is switched on for 60 seconds, during which start-up of the burner is deferred.

Burner start-up

The electric motor starts up and drives the combustion air blower impeller and the fuel pump.

After approx. 10 seconds the ignition is switched on, following which the fuel solenoid valve opens.

Within this 10 second period a rotary check of the electric motor is performed.

In the combustion chamber the combination of fuel and combustion air forms a combustible mixture.

The mixture is ignited by a high-voltage ignition spark.

The flame monitor detects the flicker frequency of the flame and switches off the ignition spark generator.

The hot flammable gases flow through the heat exchanger and conduct the heat to the heating medium.

Please note!

- The heater works as a function of the heat requirement. Hence switching on and off times of the burner are of different lengths.
- The water pump continues to operate the whole time that the heater is on, as well as in the controlled intervals and during the delayed shutoff.

Options

- When the "Lower Temperature" option is selected, the adjustable "ON / OFF" temperatures drop by approx. 8K. For information regarding the "ON / OFF" switch for reducing the temperature, see the wiring diagrams on pages 48 to 50.
- The water pump can also be operated independently of the *HYDRONIC* if controlled appropriately. For information regarding the additional "ON / OFF" switch for separate control of the water pump, see the wiring diagrams on pages 48 to 50.
- The vehicle blower is controlled by being switched on and off at the following temperatures.
 - Water temperature $>55^{\circ}\text{C}$ --> vehicle blower "ON"
 - Water temperature $<50^{\circ}\text{C}$ --> vehicle blower "OFF"For further information on control of the vehicle blower, see wiring diagrams on pages 48 to 50.

Switching off the *HYDRONIC*

Once the *HYDRONIC* has been switched off, the fuel solenoid valve closes and at the same moment the 3-minute delayed shutoff commences.

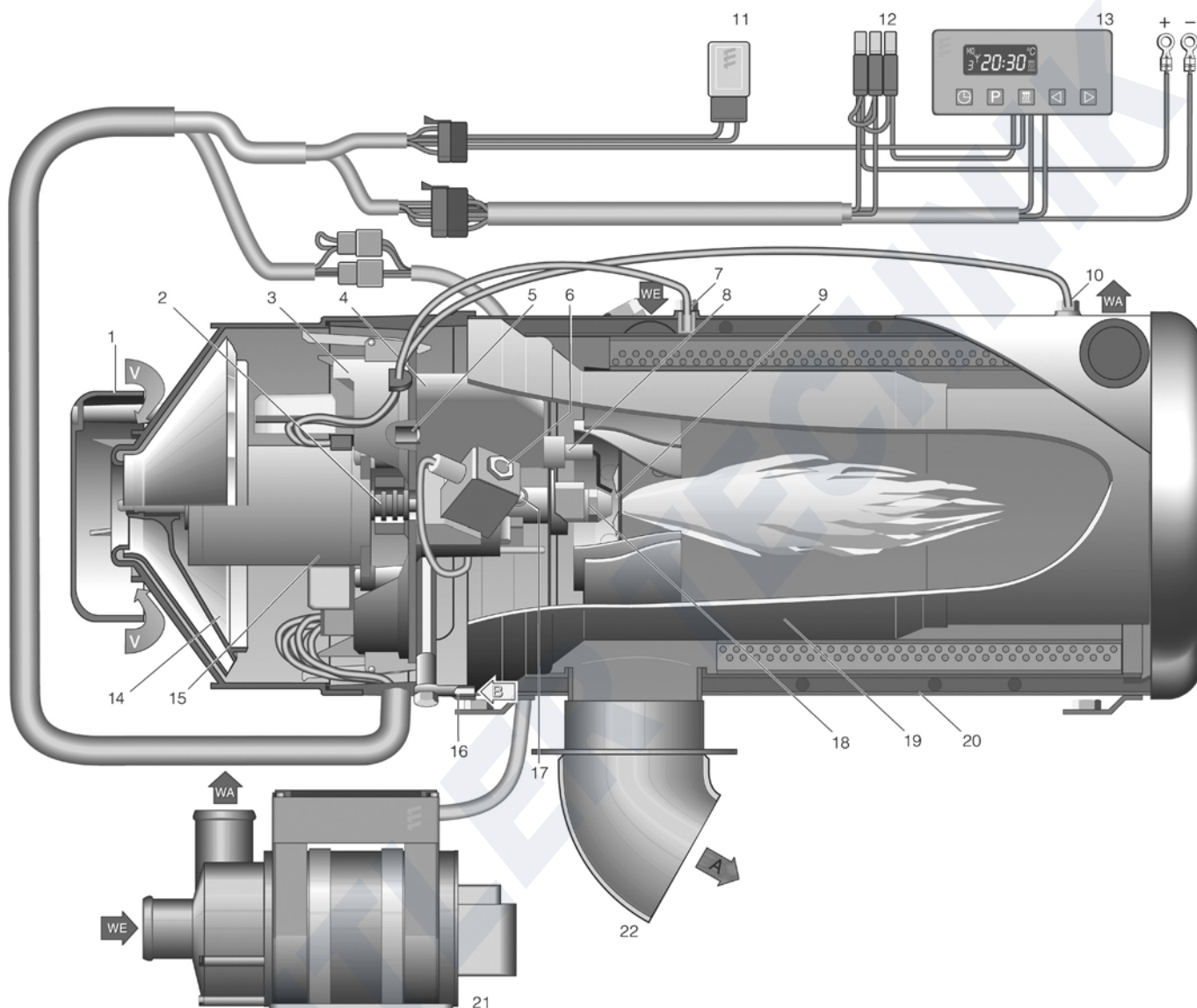
Following termination of the delayed shutoff, the *HYDRONIC* is automatically switched off.

Please note!

- The fuel continues to circulate until the heater is switched off, including during the delayed shutoff period.

2 / Product Information

Sectional view

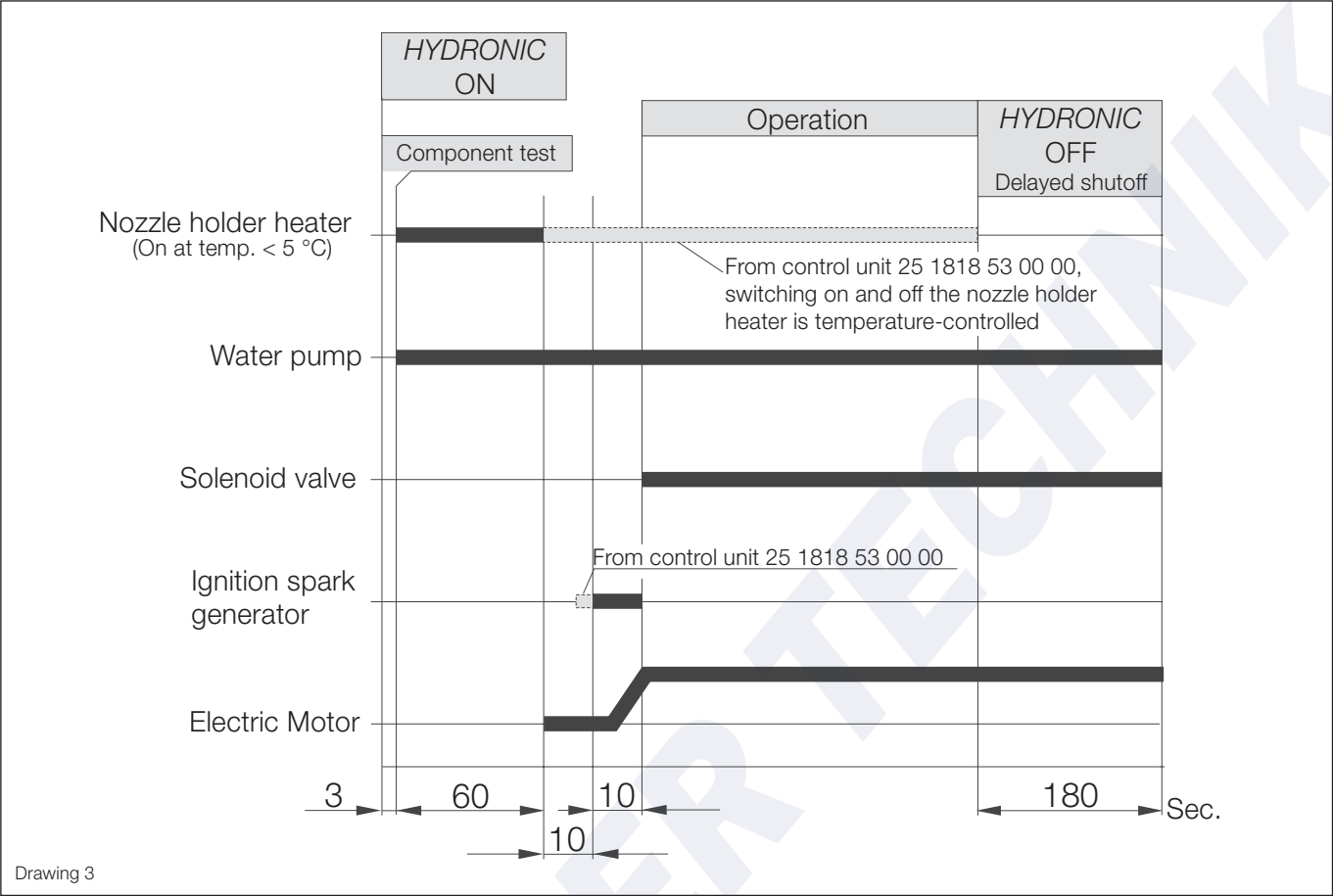


Drawing 2

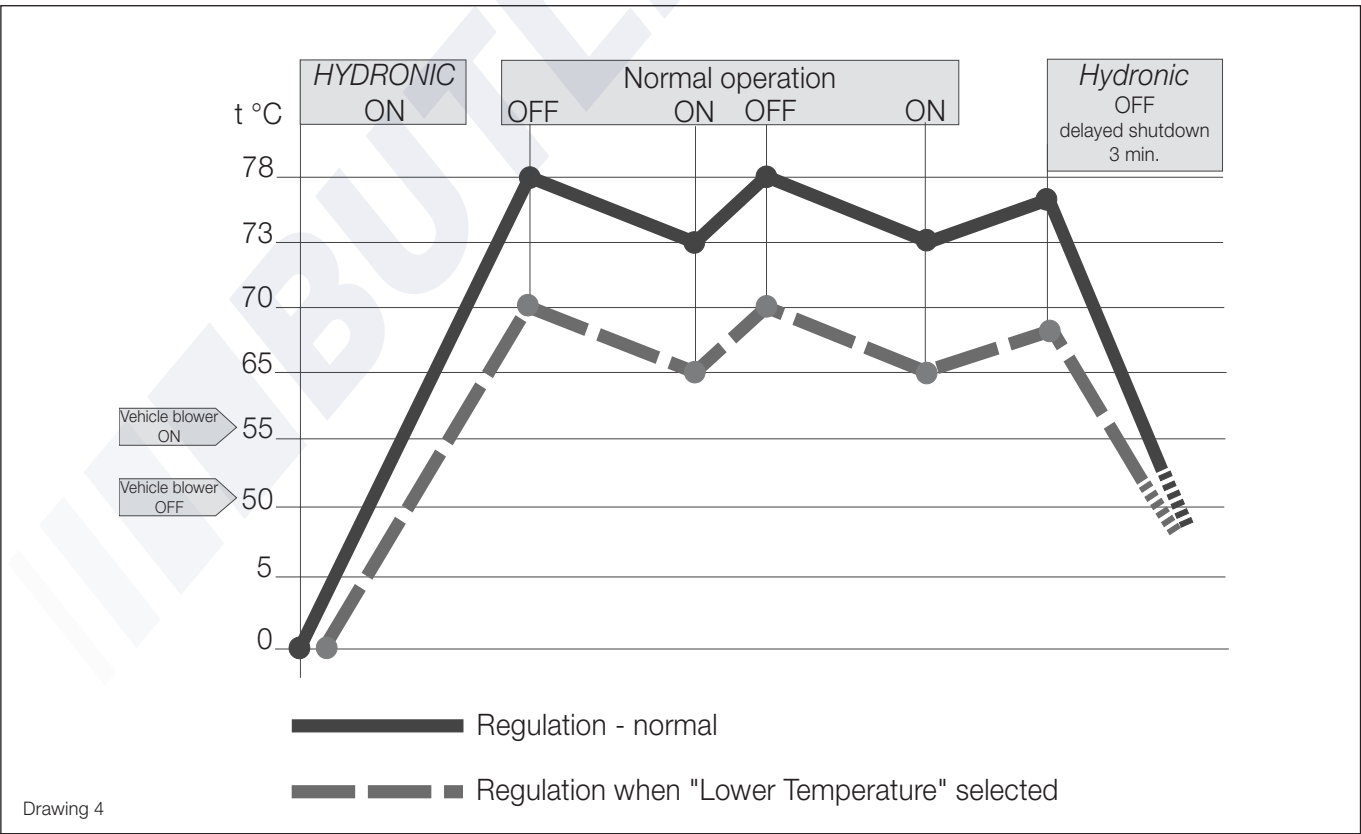
1	Hood (CO ₂ setting)	12	Fuses	A	Exhaust gases
2	Coupling	13	Modular timer	B	Fuel
3	Control unit	14	Fan wheel	V	Combustion air
4	Ignition spark generator	15	Electric motor	WA	Water outlet
5	Flame monitor	16	Fuel connection	WE	Water inlet
6	Solenoid valve	17	Nozzle holder heater		
7	Temperature sensor	18	Fuel atomizer nozzle		
8	Ignition electrodes	19	Flame pipe		
9	Combustion chamber	20	Heat exchanger		
10	Safety thermal cutout sensor	21	"Bus 2000" water pump		
11	Relay (vehicle blower control)	22	Exhaust pipe connection		

2 / Product Information

Functional diagram







Control diagram





2 / Product-Information

Technical Data	HYDRONIC 16	HYDRONIC 24	HYDRONIC 30	HYDRONIC 35
Test symbol	S  329	S  297	S  295	S  296
Heating medium	Mixture of water and refrigerant (Max 50% proportion of refrigerant)			
Heating capacity (at ambient temperature of 20°C)	16,000 W	24,000 W	30,000 W	35,000 W
Temperature control values - at water inlet	ON 73 °C / OFF 78 °C			
Temperature control values - at water outlet	ON 85 °C / OFF 118 °C			
Fuel	Commercial grade diesel - DIN 51601 or fuel oil EL - DIN 51603			
Fuel consumption (at ambient temperature of -10°C)	2.0 l/h	2.9 l/h	3,65 l/h	4,2 l/h
Rated voltage	24 V			
Lower voltage limit The control unit is protected against undervoltage so that when the voltage drops to the predefined limit, the HYDRONIC is switched off.	19 V			
Upper voltage limit The control unit is protected against overvoltage so that when the voltage limit is exceeded, the HYDRONIC is switched off .	30 V			
Electric power consumption (during combustion / without circulating pump)	60 W	80 W	105 W	120 W
Water content of heat exchanger	Approx. 2 l			
Water content of water circulation system	Min. 10 l			
Minimum throughput of heating medium (± 200 l/h)	1,400 l/h	2,000 l/h	2,600 l/h	3,000 l/h
Permissible ambient temperature	In operation: -40°C to +85°C During transportation / in storage: -40°C to + 100°C For combustion air: <60°C Supply medium: -40°C to +90°C / for a short time up to +120°C			
Operating pressure (water circulation system)	< 2,5 bar			
CO ₂ - value	9 -11 vol. %	9 -11 vol. %	9 -11 vol. %	9.5 -11.5 vol. %
CO in exhaust gas	< 0,04 vol. %			
Smoke spot number (Bacharach scale)	< 4			
Weight	Approx. 18 kg			
Radio interference suppression level	UKW 4 / KW 3 / MW 5 / LW 3			
Type of protection	IP 64			
Technical Data - Water Pump	Water pump standard		Bus 2000 water pump	
Voltage (±20%)	24 V			
Power consumption	110 W		250 W	
Capacity / at delivery pressure	5,000 l/h - 200 mbar		6000 l/h - 500 mbar	



Important!

The specified technical data must be adhered to, otherwise it is possible for the HYDRONIC to malfunction.

All technical data ±10 %; where deviation applies, the deviation values are specified.

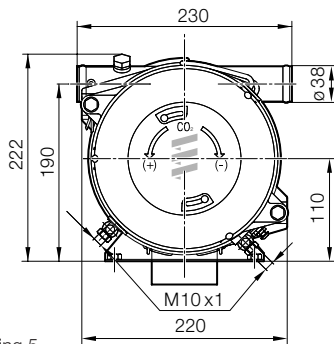
2 / Product Information

Principal dimensions

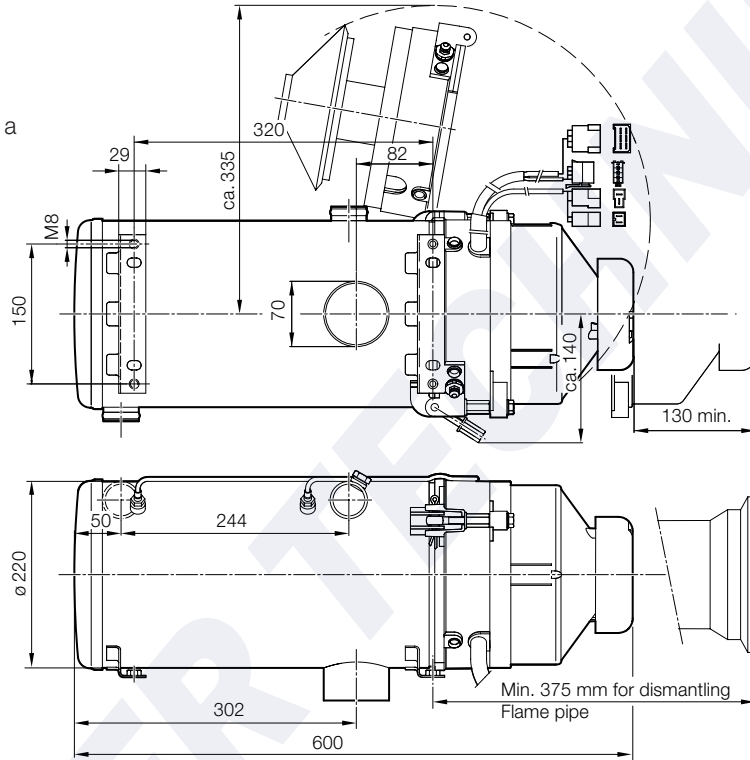
HYDRONIC - standard model

Please note!

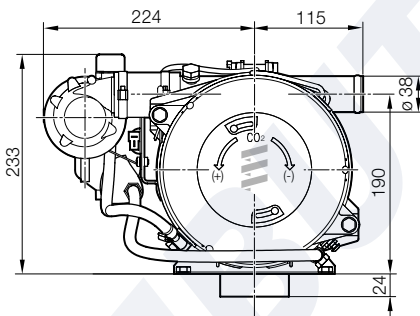
- If there is enough space, the burner can be swung out for routine checks - see drawing.
- The principal dimensions are the same when a hood with hose connection is mounted.



Drawing 5

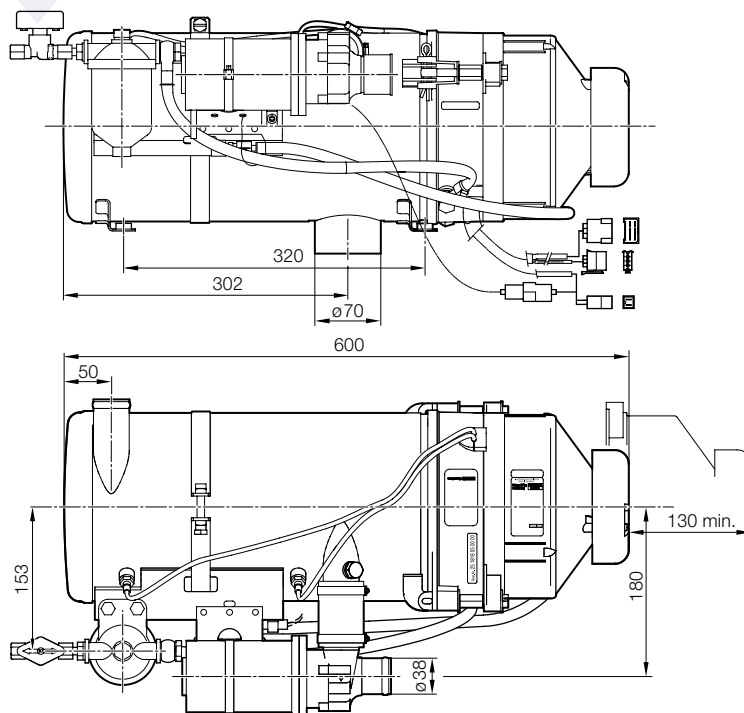


HYDRONIC - compact model



Please note!

- The principal dimensions are the same when a hood with hose connection is mounted.



Drawing 6

3 / Installation

Installation position

The heater should be installed as low down as possible in the vehicle, e.g. in the engine compartment or in a stowage area.

This will ensure that the heater and water pump are automatically ventilated.

Other installation positions are also permitted as long as they comply with the installation requirements stated in these Installation Instructions.

When choosing where to install the heater, care must be taken to ensure that there is sufficient space to disassemble the hood (130 mm) and the flame pipe (375 mm).

All openings towards the outside must be splash-proof.

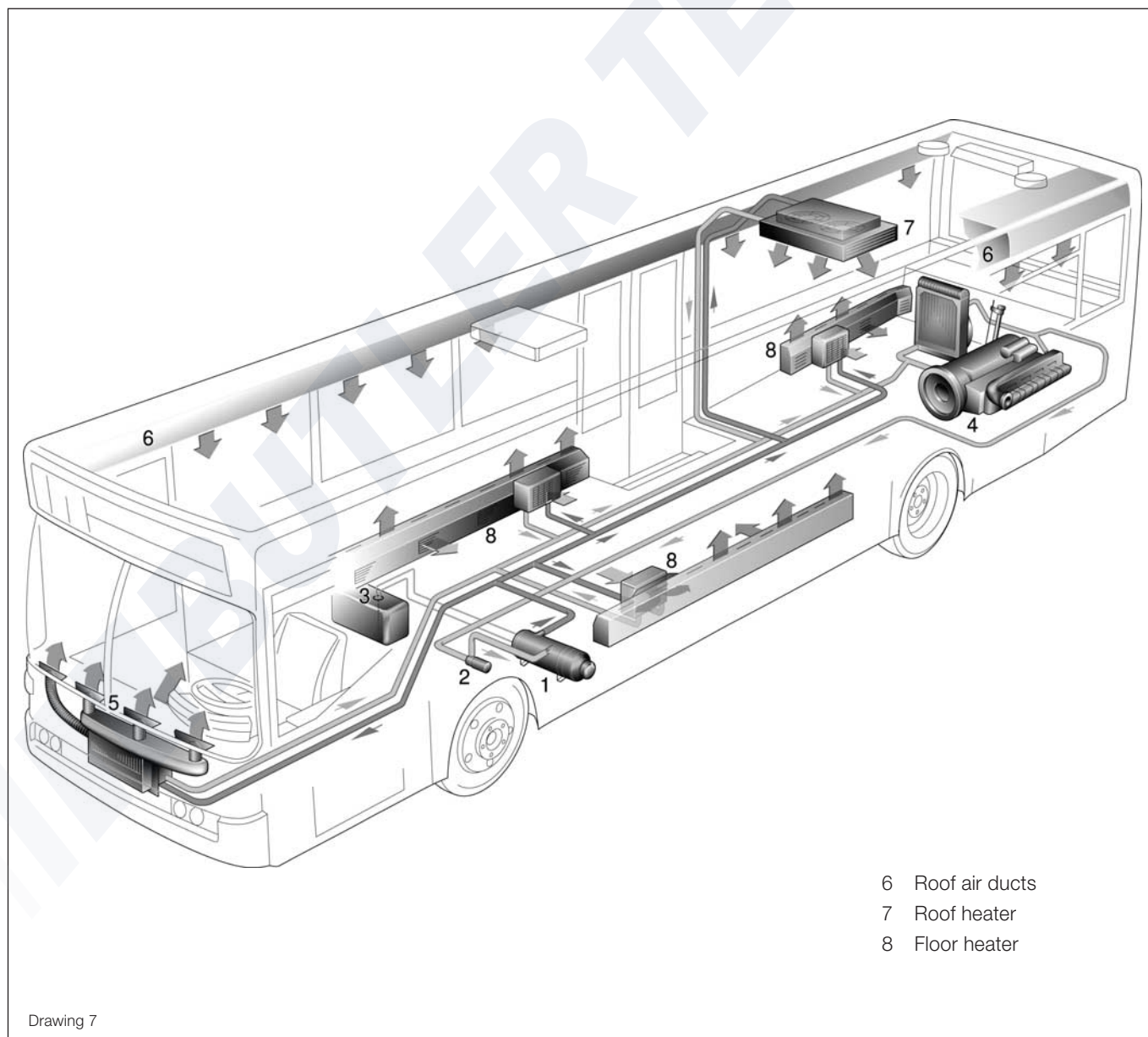
§ Regulation!

- Installation in the driver's cab or passenger compartment of buses containing more than eight seats in addition to the driver's seat is not permitted.

Please note!

- Mount the *HYDRONIC* below the minimum cooling water level (expansion tank, radiator, vehicle heat exchanger).
- Further information on installation (e.g. for boats and ships) is available from the manufacturer on request.
- For installation of the *HYDRONIC* in a case, see page 16.

Example of a *HYDRONIC* installation in a bus



Drawing 7

3 / Installation

Installation of the *HYDRONIC* in a case

If installation in the engine compartment or stowage compartment of the vehicle is not possible, then the *HYDRONIC* can also be installed in a case.

The case containing the installed *HYDRONIC* is then affixed to the vehicle at a suitable location, e.g. to the longitudinal chassis frame.

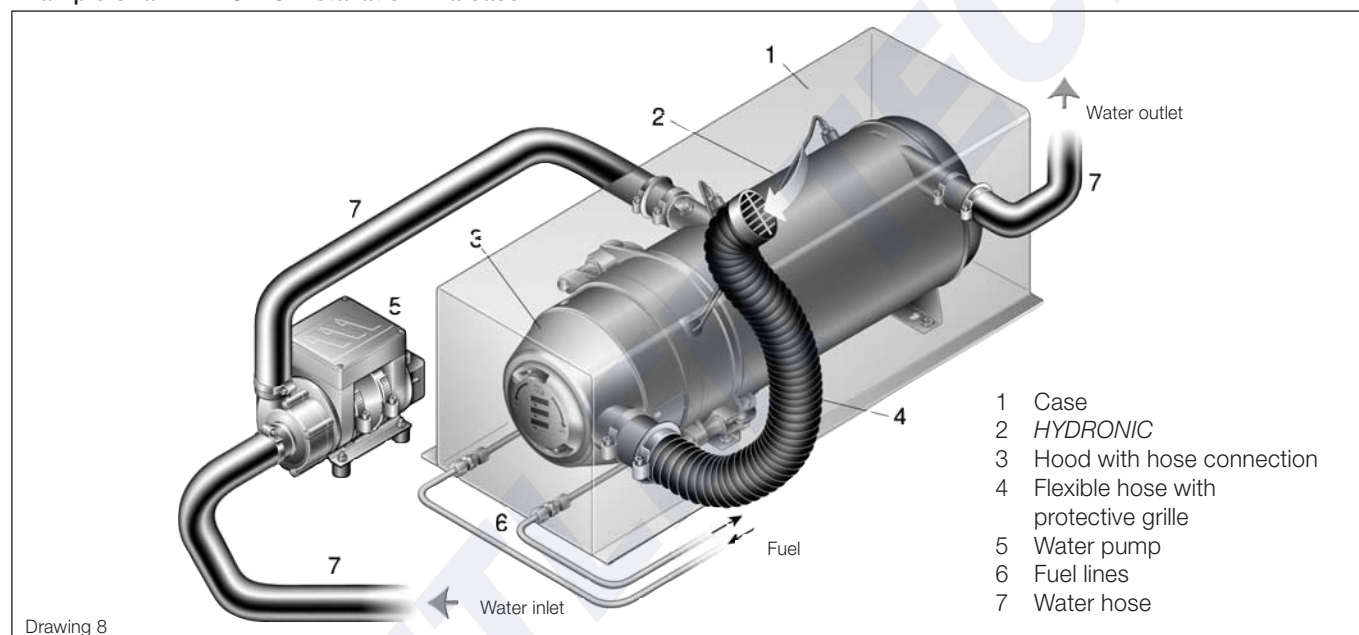
It is recommended that a hood with a hose connection is mounted for the combustion air intake. The combustion air is then drawn in outside of the case via a flexible hose.

In this way it is possible for the combustion air to be drawn from an area where the temperature is within the permitted range and protection is provided against dirt accumulation. Place a protective grille on the flexible hose.

Please note!

- The case must be sufficiently ventilated from outside that the permitted ambient temperature is not exceeded.
- Air vents must be arranged on the case in such a way that they cannot become clogged up with dirt or snow.
- Any water which penetrates the case must be able to flow out.

Example of a *HYDRONIC* installation in a case



Rating plate

§ Regulation!

- The year in which the heater was first commissioned must be shown permanently on the rating plate. For this purpose 3 year numbers are printed on the appropriate area of the rating plate. The applicable year must be indicated by removing the years which are not applicable.
- The *HYDRONIC* rating plate is attached to the burner and must also be in easy view in the installed condition. If this is not the case, a duplicate containing the same information as the original rating plate can be attached. The duplicate must be attached in a prominent position on the *HYDRONIC* or on a cover in front of the *HYDRONIC*.

The duplicate is affixed to the hood in a manner which enables it to be taken off.

J. EBERSPÄCHER ESSLINGEN MADE IN GERMANY	
Heizgerät Typ	Hydronic 30
Ausführung	D30W N
Ausführ. - Nr.	25 1818
Fabrik Nr.	
Prüfzeichen	~ S295
Brennstoff	Diesel
Elektr. Werte	105W 24V
Wärmestrom	30.000 W
Betriebs- überdruck	max. 2,5 bar
  021076	
Einbau nicht im Fahrer bzw. Fahrgastraum Erste Inbetriebnahme 	

Heater type
Model
Model no.
Factory no.
Test symbol
Fuel
Electrical rating
Heating capacity
Operating gauge pressure

Not to be installed in
driver's cab or
passenger compartment
Data first used

Drawing 9

3 / Installation

Permissible installation positions and attachment of the *HYDRONIC*

The *HYDRONIC* should if possible be installed in the normal position.

To do this, transfer the 4 fastening holes and the through-hole for the exhaust outlet - as shown in the diagram - to the mounting surface and drill.

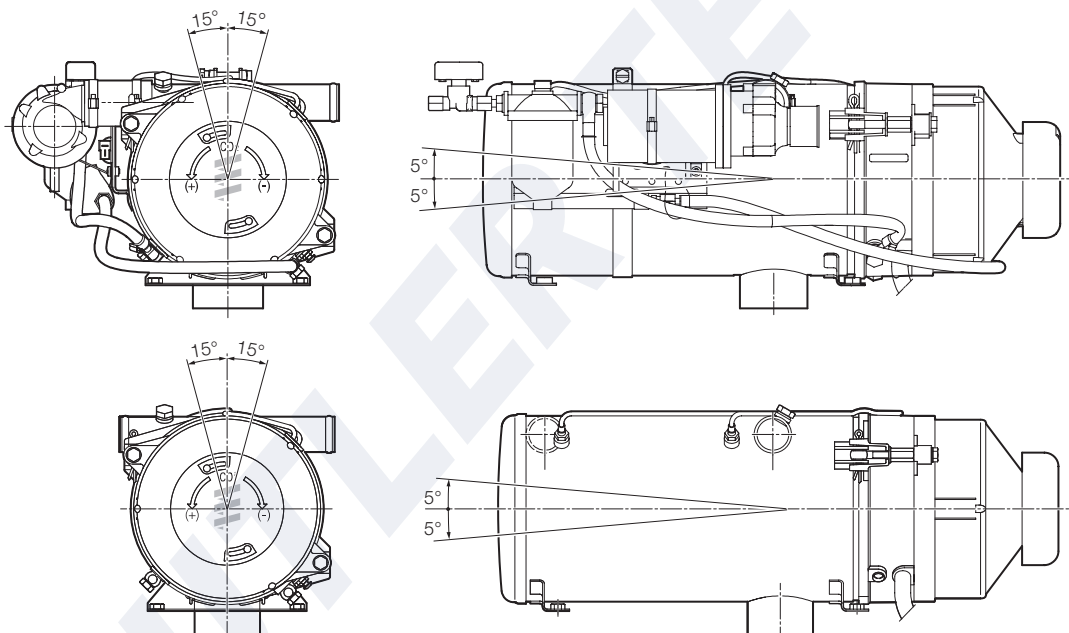
Fasten the *HYDRONIC* to the vehicle with the two mounting supports.

Please note!

- The support surface for the two mounting supports of the *HYDRONIC* must be flat.
- Depending on the installation conditions, the *HYDRONIC* can be inclined, as shown in the diagrams. During operation of the heater a deviation from the normal position - caused by the incline of the vehicle - of up to $+15^\circ$ in all directions is possible.

Permissible installation positions and template for holes for the *HYDRONIC* - standard model and compact model

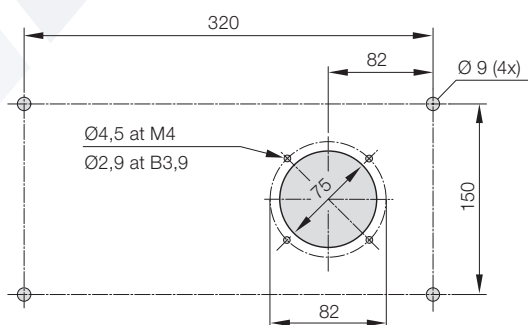
Compact model - must be installed in level position with the deviations shown in the diagram.



Standard model

- Must be installed in level position with the deviations shown in the diagram
- Can also be installed in vertical installation position without any deviations.

Hole template for the *HYDRONIC* - standard model and compact model



Drawing 10

3 / Installation

Installation of the water pump

The water pump must be installed at the lowest point in the water circulation system, taking into account the installation position - see diagrams.

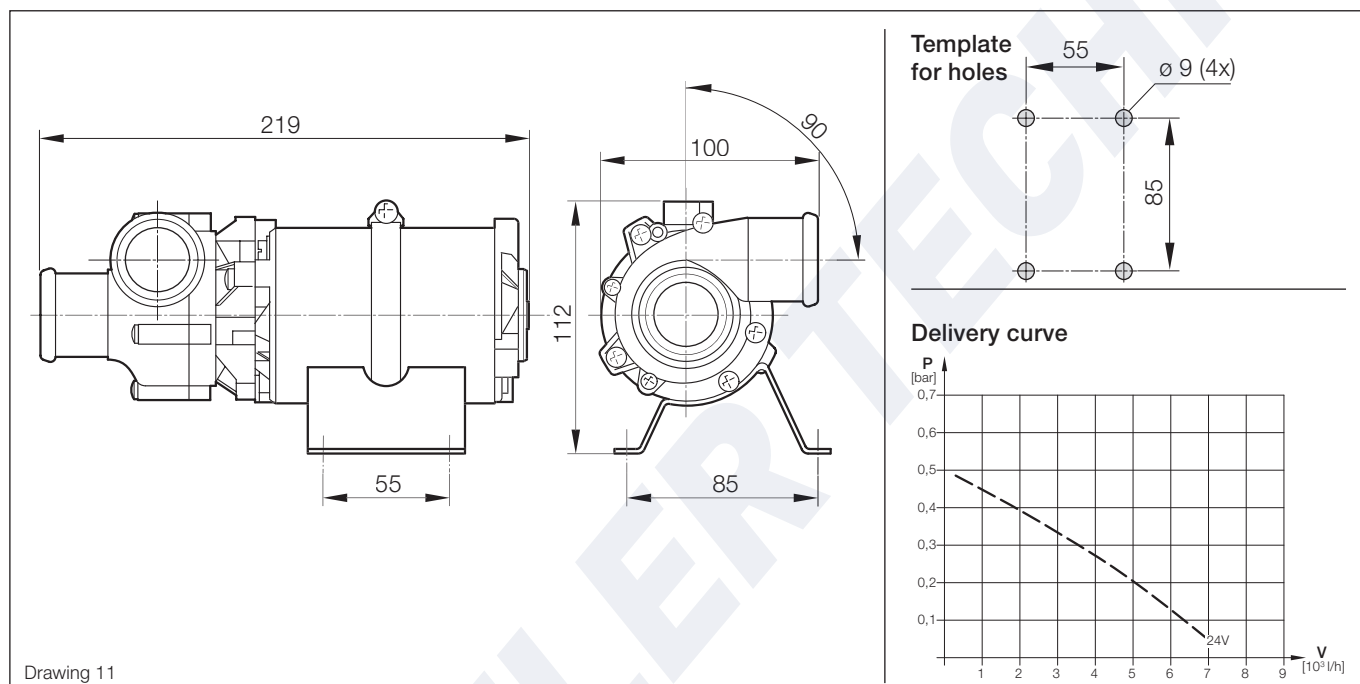
Transfer the four fastening holes for the water pump holder to the mounting surface - as shown in the diagram - and drill. Attach the water pump to the vehicle with the holder.

Please note!

- No shutoff valves may be inserted in the water hose for the water pump (intake side).
- The surface in contact with the water pump holder must be flat.

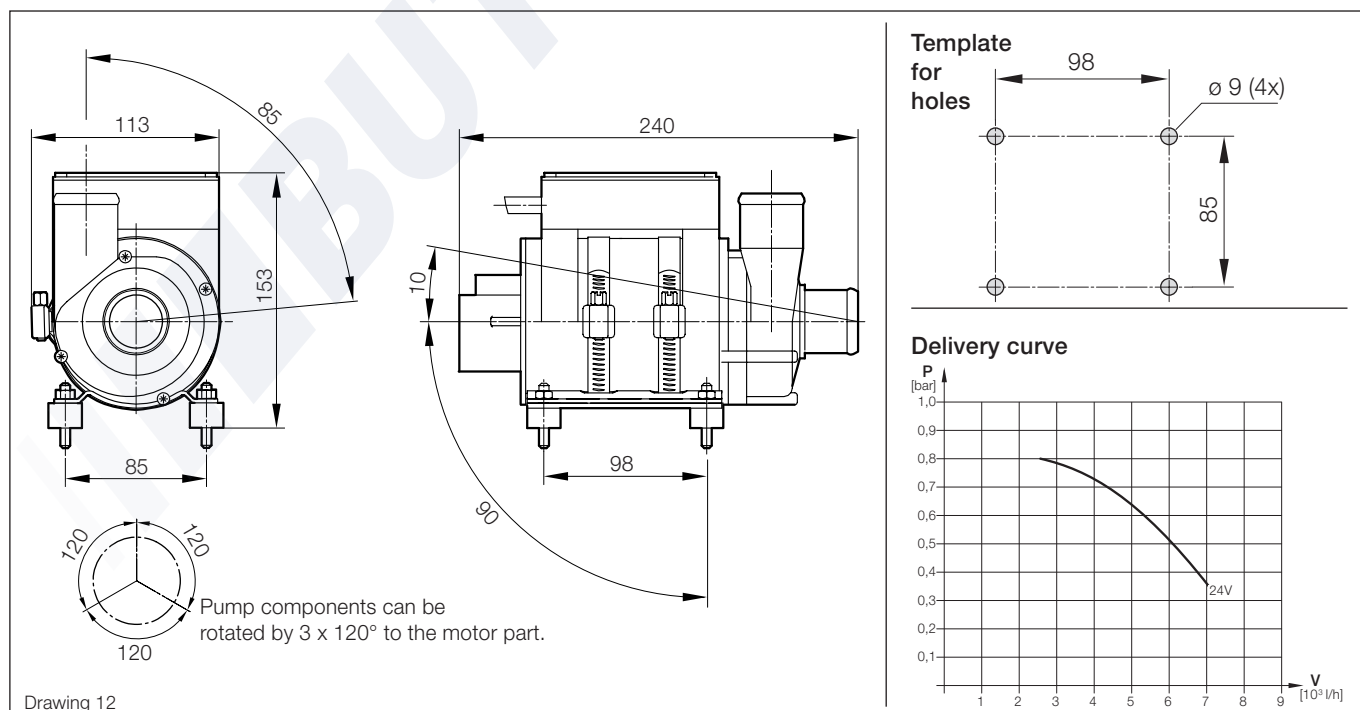
Water pump - standard model

Principal measurements and permissible installation positions



Bus 2000 water pump

Principal measurements and permissible installation positions



3 / Installation

Exhaust gas piping

§ Regulation!

- The outlet must be implemented in such a way that insertion of a 16 mm dia. ball is not possible.
- Exhaust pipes must be laid in such a way that there is no likelihood of any exhaust gases entering the vehicle interior.
- The functioning of parts of the vehicle which are important for its operation must not be impaired.
- It must not be possible for condensate or water to collect in the exhaust gas line.
Drain holes are permitted. These must convey the fluid through the interior in sealed pipes to the outside.
- The exhaust pipe opening should face upwards or to the side or, if the exhaust piping is laid below the floorpan of the vehicle, it should extend to near the side or rear of the driver's cab or vehicle.

⚠ Danger of combustion and poisoning!

- Whenever combustion occurs high temperatures and exhaust gases with toxic elements are generated.
 - Do not perform any work on the exhaust gas piping while the heater is on.
 - If any work needs to be done to the exhaust gas piping, switch off the *HYDRONIC*, wait until all components have completely cooled and, if necessary, wear protective gloves.
 - Do not breathe in any exhaust gases.

⚠ Important!

- The entire exhaust gas piping is very hot both during and immediately after operation of the heater.
 - Mount exhaust pipe with sufficient separation away from parts which are sensitive to the heat.
 - In particular, look out for fuel lines (plastic or metal), electric lines and brake hoses.
 - Exhaust pipes must be securely fastened (with a recommended standard distance 50 cm) in order to avoid damage through vibration.
 - Lay the exhaust gas piping so that the exhaust gases are not drawn in directly as combustion air.
 - When installing the *HYDRONIC* in a case and with a short exhaust pipe, the exhaust gas piping must run to the outside through the bottom of the case.
 - The functioning of parts of the vehicle which are important for its operation must not be impaired (take care to allow sufficient separation).
 - The opening of the exhaust gas pipe must not be allowed to become clogged up with dirt or snow.
 - The opening of the exhaust gas pipe must not be pointing in the direction of travel.

Fitting exhaust gas piping

The exhaust gas piping can be laid out as shown below. See also page 20, Diagram 14:

- Exhaust pipe connection, bent by 60°, dia. = 70 mm
- Exhaust pipe connection, dia. = 70 mm
- Exhaust pipe bend, dia. = 70 mm
- Rigid exhaust pipe from unalloyed or alloyed steel, dia. = 70 mm, length max. 4 m, wall thickness min. 1 mm
Also required:
1 exhaust pipe bend, dia. = 70 mm
1 end sleeve
- Flexible exhaust pipe out of alloyed steel dia. = 70 mm, length max. 4 m
Also required:
1 end sleeve

Attach the exhaust pipe with pipe clips to the floorpan of the vehicle in suitable places.
Mount an end sleeve with crossbars on the exhaust pipe.

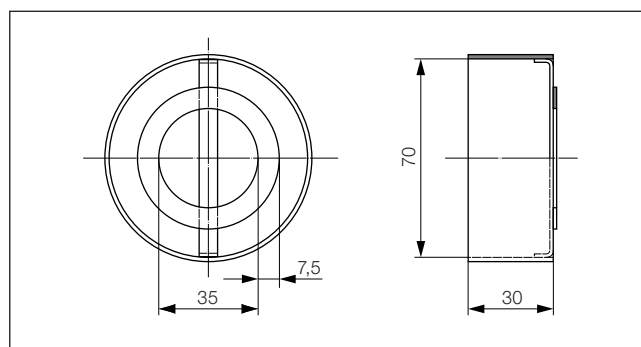
The exhaust gas piping can be bent a max. 3 x 90°, in which case the overall length is reduced by 0.5 m for each 90° bend.

To enable the condensate to flow out, drill a hole 5 mm dia. at the lowest point on the exhaust gas piping.

Please note!

- The rigid exhaust pipe and the flexible exhaust pipe are currently not included in the Eberspächer scope of supply. If required, these exhaust pipes must be obtained from a specialist shop.
- If necessary, you can make the end sleeve with crossbars (out of metal) for the exhaust pipe yourself (see diagram).

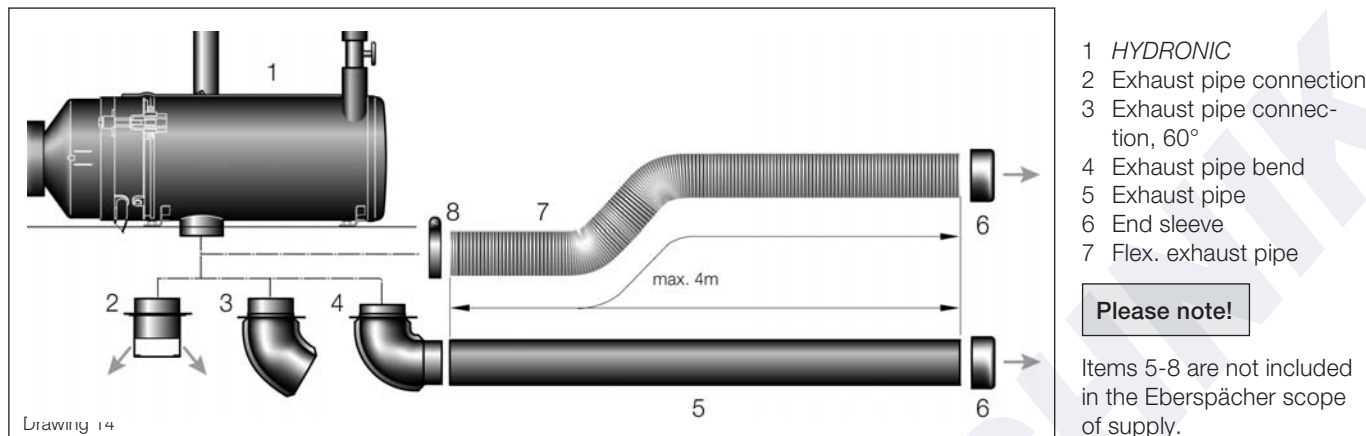
End sleeve with crossbars



Drawing 13

3 / Installation

Examples of exhaust gas piping



Combustion air piping

§ Regulation!

- The necessary combustion air must be drawn from the outside.
- The combustion air inlet must be implemented in such a way that insertion of a 16 mm dia. ball is not possible.

Please note!

- When laying the combustion air piping the following should be noted:
 - The combustion air inlet must always be uncovered.
 - Lay the combustion air inlet so that exhaust gases are not drawn in directly as combustion air.
 - Do not position the combustion air inlet so that it faces the vehicle's air stream.
 - Combustion air inlet must not be allowed to become clogged up with dirt or snow.
 - Any water that has penetrated must be able to drain off.

Combustion air intake when the *HYDRONIC* is installed in a case

When installing the *HYDRONIC* in a case, it is recommended that a hood with hose connection is mounted to draw in the combustion air.

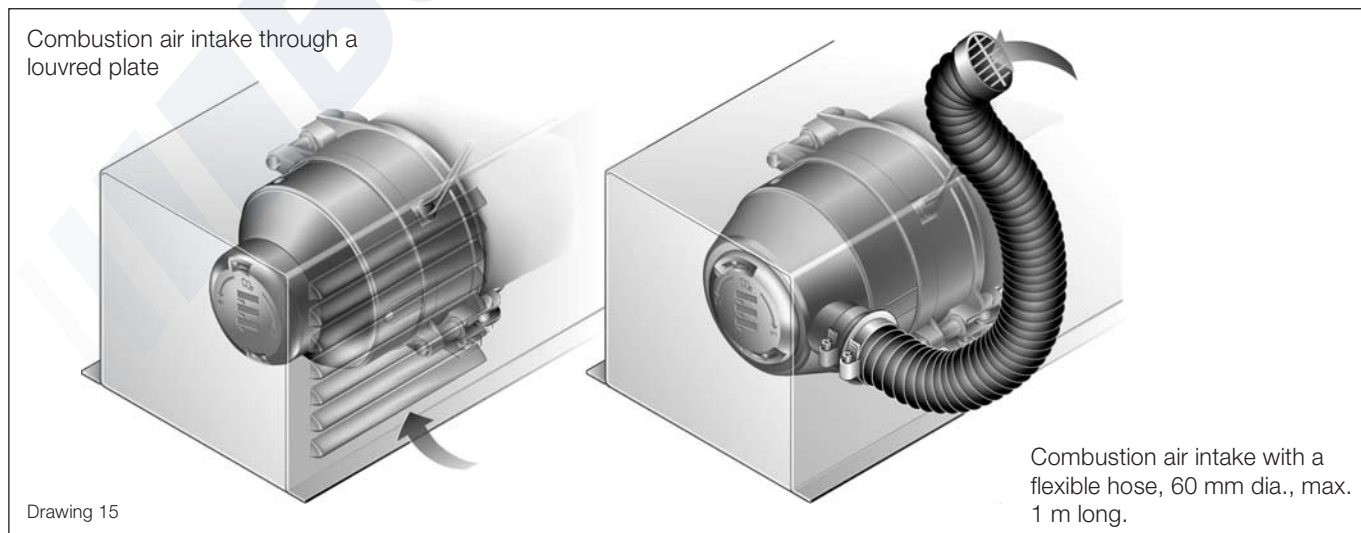
The combustion air is then drawn in outside of the case via a flexible hose.

In this way it is possible for the combustion air to be drawn from an area where the temperature is within the permitted range and protection is provided against dirt accumulation. Place a protective grille on the flexible hose. If the hood with hose connection is not used, the combustion air must be drawn in through an air vent with an effective minimum cross-section corresponding to a pipe of 60 mm dia.

Please note!

- The air vent for the combustion air must be positioned on the case in such a way that
 - it cannot become clogged up with dirt or snow
 - exhaust gases cannot be drawn in.

Examples of combustion air piping



3 / Installation

Coolant circuit

Warning: contact with hot parts could cause burning.

- The coolant and the coolant circuit components can get very hot.
 - Lay and attach water-carrying parts in such a way that there is no danger of burning to humans, animals or any temperature-sensitive material from either heat radiation or direct contact.
 - Prior to working on the coolant circuit, switch off the *HYDRONIC* and wait until all components have cooled down completely, if necessary wearing gloves.

Please note!

- When installing the *HYDRONIC*, note carefully the direction of flow of the coolant circuit.
- The water hoses must be laid in such a way that they are buckle-free and if possible are sloping upwards.
- When laying the water hoses, make sure you leave a sufficient gap between hoses and any hot parts of the vehicle.
- All water pipes must be protected against chafing and excessively high temperatures.

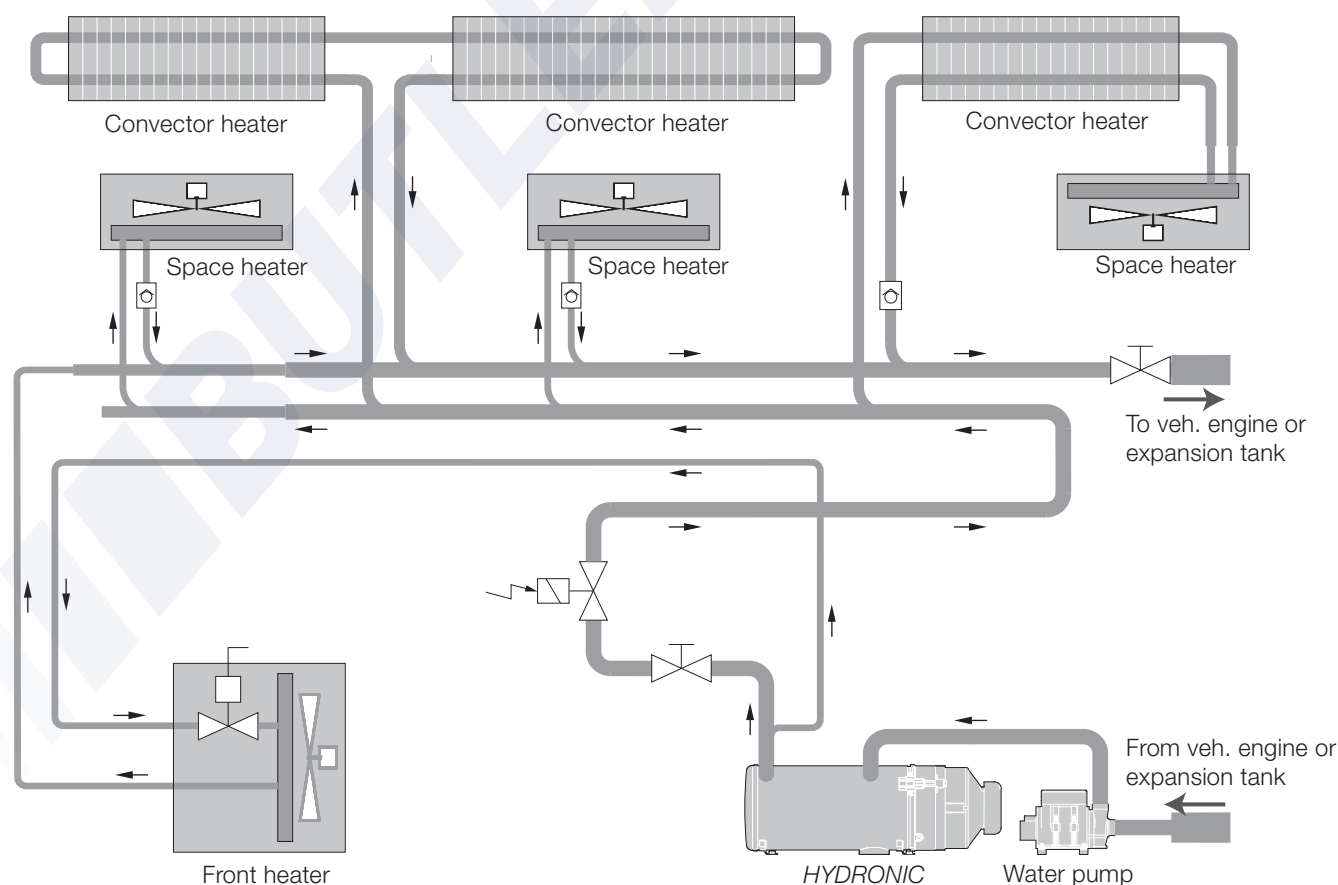
- Secure all hose connections with hose clips (fastening torque 1.5 Nm).
- Re-tighten the hose clips after the vehicle has been in operation for 2 hours or 100 km have been driven.
- The minimum water through-flow is only guaranteed if the difference in temperature between the heating medium inlet and outlet does not exceed 10°C during combustion.
- There must be at least 10 litres of coolant in the coolant circuit.
- Only relief pressure valves with an opening pressure of min. 0.4 - max. 2 bar may be used in the coolant circuit.
- Before using the heater for the first time or after changing the coolant, the entire coolant circuit must be bled so that it is bubble-free in accordance with the manufacturer's specification and, if necessary, it must then be topped up with coolant approved by the vehicle manufacturer.

Installation example

The *HYDRONIC* is installed into the coolant circuit of the vehicle.
Another installation variant is to install a separate coolant circuit for the *HYDRONIC* with an expansion tank.

Water circulation system

The diagram shows the *HYDRONIC* integrated into the coolant circuit of a bus.



Drawing 16

3 / Installation

Fuel supply

§ Regulation!

- When laying fuel lines and installing an additional fuel tank, §§45 and 46 StVZO (regulations governing the registration of motor vehicles) must be adhered to.
Excerpt from §§45 and 46 StVZO:
 - Fuel tanks may not be contained in passenger compartments or driver's cabs of buses. They must be positioned in such a way that in the event of a fire the exits are not directly endangered.
 - Fuel lines may not be contained in compartments or driver's cabs of buses.

⚠ Danger of fire, explosions and poisoning!

- When working on the fuel supply, shut down the vehicle engine and the *HYDRONIC*.
- Avoid naked flames while handling fuel.
- Do not smoke. This applies also where fuel can be detected only by its characteristic smell.
- Do not breathe in fuel vapour.

⚠ Important!

- Secure all connections on fuel hoses with clips.
- Use connecting hoses (approx. 50 mm long) when connecting up fuel pipes and secure with clips.
- Cut fuel hoses and pipes to length only using a sharp knife. Cuts must not be pressed in or have any burr.
- Exhaust pipes must be securely held in position (with a recommended standard distance 50 cm) in order to avoid damage and / or noise during vibration.
- Lay the fuel lines in such a way that twisting movements of the vehicle and movements of the engine and similar cannot have any adverse effect on durability.
- Fuel lines must be protected against mechanical damage.
- Fuel carrying parts must be protected against heat arising due to malfunctions.
- Fuel lines must never be laid or fastened directly next to exhaust piping for the *HYDRONIC* or the vehicle engine. Where lines cross, make sure there is always sufficient space separating the hot parts, and if necessary apply heat protection sheets.
- Dripping or vaporizing fuel must not be allowed to collect or ignite on hot parts or on electric fixtures.

Connection of intake and return pipes to the heater

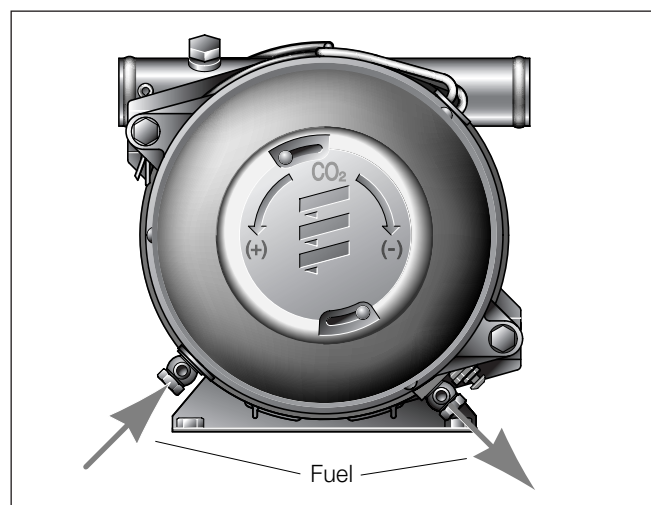
The fuel is taken from the vehicle fuel tank or from a separate fuel reservoir.

Any of the normal fuel hoses or pipes used in vehicle manufacturing, e.g. steel, copper or plastic pipes, can be used as fuel lines.

Fuel hoses and fuel pipes are available as additional equipment - see pages 8 and 9 or the Additional Equipment Catalogue.

Please note!

- When operating with one-line systems ---> please consult the manufacturer.



Drawing 17



3 / Installation

Permissible fuel line dimensions

Inner diameter of the intake pipe = 6 mm dia. to 8 mm dia.

Inner diameter of the return pipe = 6 mm dia. to 8 mm dia.

Permitted intake head and length of intake pipe:

- Where intake head is up to 1.5 m ---> max. length = 25 m.
- Where intake head is 1.5 m to 4.0 m ---> max. length = 15 m.

Permitted line lengths of the return pipe

- Max. length = 18 m

Fuel quality

All commercial grade diesel which complies with DIN 51 601 may be used as fuel. Any heating oils which comply with class EL, DIN 51 603 can also be used.

At temperatures below 0°C diesel must be used as specified in the table below.

Please note!

- Admixing waste oil is prohibited.
- It must be possible to filter the fuel under all conditions of use (as specified in DIN EN 116).
- The *HYDRONIC* is not approved for use with PME (biodiesel according to DIN V 51606).

Temperature	Winter diesel		Summer diesel or EL fuel oil		Additive	
					Petroleum	Regular-grade petrol
0 °C to -10 °C	100%	or	70%	+	30%	or 30%
-10 °C to -15 °C	100%	or	50%	+	50%	----
-15 °C to -20 °C	70%	----	----	+	30%	or 30%
-20 °C to -25 °C	50%	----	----	+	50%	----

Electrical system

§ Regulation!

- Electrical leads, switches and control units for heaters must be arranged in the vehicle so that their operation under normal operating conditions is not impaired in any way. All lines leading from heaters to the outside must be laid so that they are splash-proof at the opening.
- It must be easy for the user to determine the operating state (as a minimum, whether switched on or off).

Electrical connection of the *HYDRONIC*

The detailed electrical connection of the *HYDRONIC* and the control element is shown in the wiring diagrams on pages 48 to 50.

Please note!

- The wire sizes specified in the wiring diagram must be noted and adhered to.
- Run “positive-negative” cable section from the *HYDRONIC* directly to the battery and connect up.
- When laying the electrical lines care must be taken to ensure that their insulation cannot be damaged as a result of wear, bending, becoming caught or the effects of heat.

4 / Troubleshooting

In the event of faults, start by checking...

- Defective wiring (short-circuits, open circuit).
- Visual inspection for
 - corroded contacts
 - defective fuses
 - damaged electric lines, joints and connections
 - damaged exhaust gas and combustion air piping
- Battery voltage on starting up the heater <19 V (measure voltage on control unit).
- Check fuel supply.
- When changing over to Winter mode:
is summer diesel fuel still in the line?
- Delayed start-up --> nozzle holder heater switched on for 60 seconds.
- The Bus 2000 water pump and the *HYDRONIC* are automatically switched off shortly after start-up if there is insufficient coolant or the pump impeller is blocked.

Control unit locking

The control unit is locked if any of the following malfunctions occurs:

- **Overheating**
If the *HYDRONIC* overheats 3x in succession - fault code 012, displayed as AF 015 ---> the control unit is locked.
- **Flame during delayed shutoff**
If the fault "Flame during delayed shutoff" is reported 3x in succession - fault code 058, displayed as AF 016 ---> the control unit is locked.
- **Too many start attempts**
After a sequence of ten unsuccessful attempts at starting up the *HYDRONIC* - fault code 052, displayed as AF 050 ---> the control unit is locked.

Release of control unit when locked

Release of the control unit following locking is described on pages 26 to 29.

Test equipment

The following test equipment can be used for troubleshooting and repair.

	Cat. No.
• Diagnostic unit	22 1512 89 00 00
• Additionally required: adapter cable	22 1000 31 66 00
• SO adapter	22 1524 89 00 00
• Additionally required adapter cable	22 1000 31 66 00
• Test unit for burner head	22 1527 89 00 00

4 / Troubleshooting

Diagnosis

The *HYDRONIC* electronic control unit can store up to five faults.

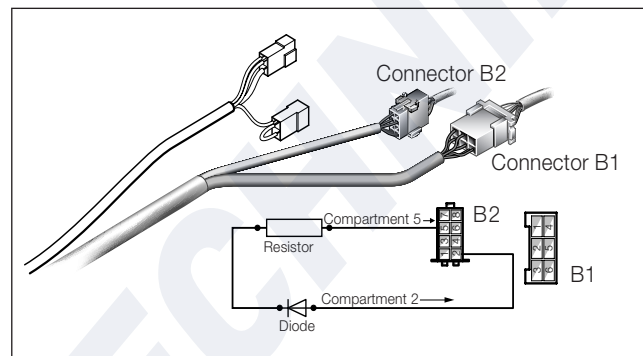
The faults can be read from the control unit and displayed by one of the following means:

- **Flashing code**

After connection of an LED and a series resistor (approx. 1 k Ω / 11 W) the function / fault is displayed as a flashing code.

For details of the flashing code signals and the corresponding faults, see table on page 26.

LED and series resistor



Drawing 18

- **Diagnostic unit**

After connection of the diagnostic unit, the function / fault is shown on the display as a number.

For information regarding the connection and operation of the diagnostic unit, see page 27.

To connect the diagnostic unit, an adapter cable is required.

For fault code table, see pages 30 to 33.



Cat. No.
diagnostic unit
22 1512 89 00 00

Cat. No.
adapter cable
22 1000 31 66 00

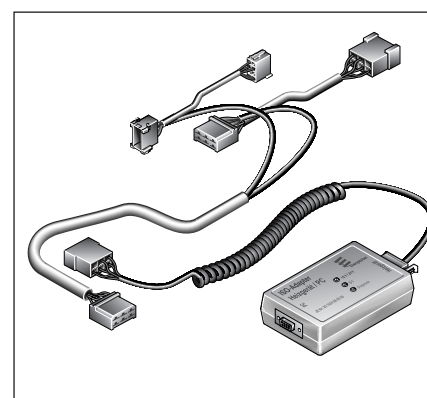
- **ISO adapter with KD 2000 software**

Following installation of the KD 2000 software and connection of the ISO adapter, the function / fault is shown as a number on the display.

For information regarding the connection and operation of the ISO adapter, see page 28.

To connect the ISO adapter, an adapter cable is required.

For fault code table, see pages 30 to 33.



Drawing 19

Cat. No.
ISO adapter
22 1524 89 00 00

Cat. No.
adapter cable
22 1000 31 66 00

- **Modular timer installed in the vehicle**

When a modular timer is installed, the function / faults can be shown as a number on the display.

For information regarding operation of the modular timer, see page 29.

For fault code table, see pages 30 to 33.



Cat. No.
modular timer
22 1000 30 34 00

- **External diagnostic system**

With an external, vehicle-specific diagnostic system
---> consult the vehicle manufacturer.

4 / Troubleshooting

Fault diagnosis - flashing code (LED with series resistor)

The electronic control unit can store up to five faults.
The function or type of fault is output by the control unit as a flashing code and displayed by an LED (with series resistor).
The LED with series resistor is connected to the cable harness of the *HYDRONIC*, using the 8-pin connector, pin 12, blue / white cable 1 mm² (see wiring diagram page 25).
The remedial measures are described in the fault code tables on pages 30 to 33 under the appropriate fault code.

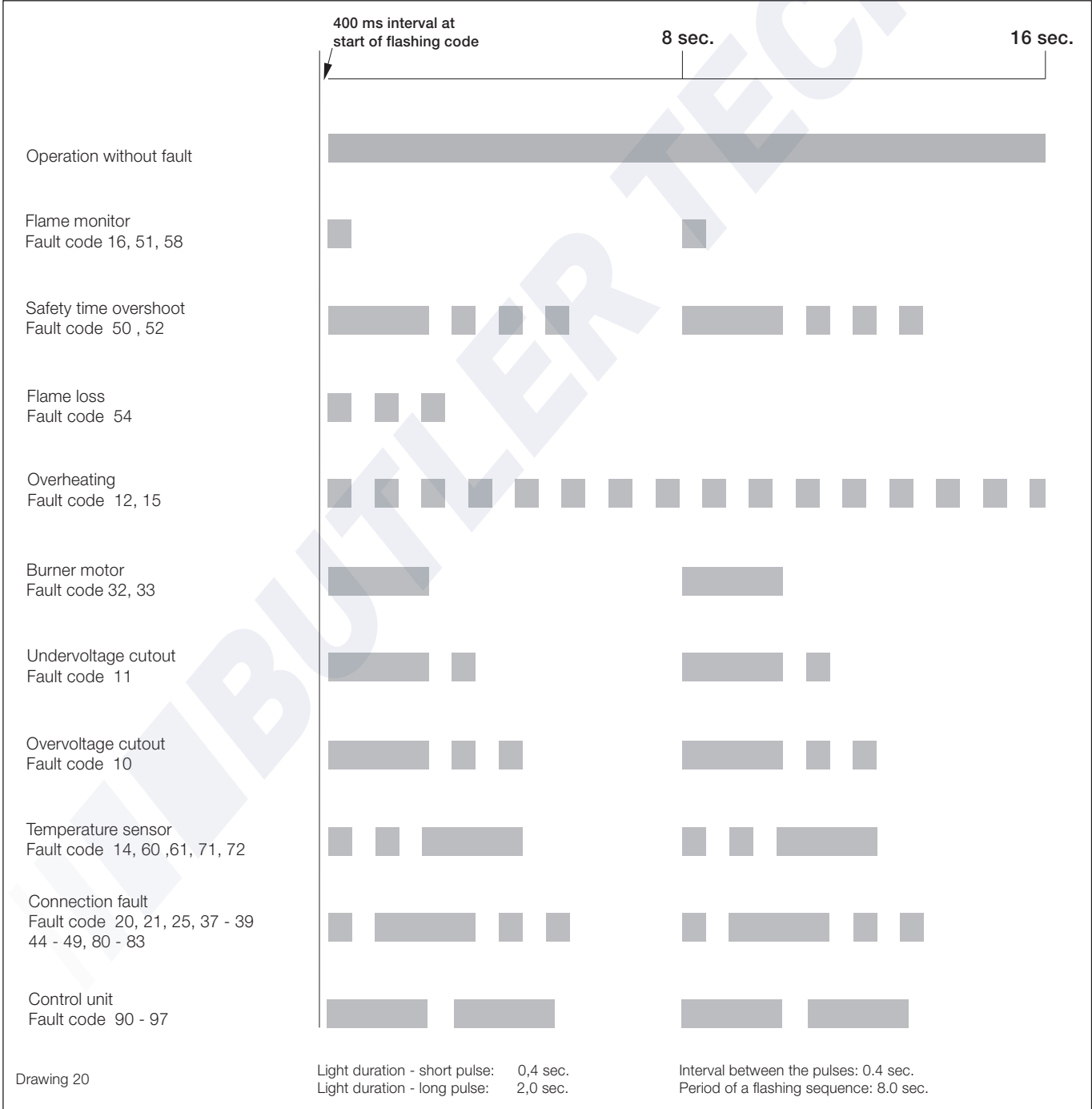
Release of control unit when locked

With the *HYDRONIC* switched on, apply positive for approx. 3 seconds to the 8-pin cable harness connector, pin 13, yellow / red 1 mm² cable (external excitation of the water pump) --> the control unit is unlocked.

Additional variant from control unit 25 1818 53 00 00

Apply positive for approx. 3 seconds to the 8-pin cable harness connector, pin 9, blue / black 1 mm² cable (fault in Bus 2000 water pump) --> the control unit is unlocked.

Flashing code



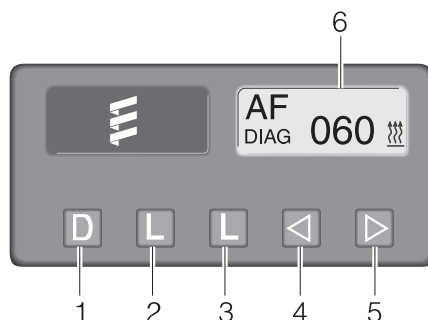
4 / Troubleshooting

Fault diagnosis with the diagnostic unit

Diagnostic unit
Cat. No. 22 1512 89 00 00

To connect the diagnostic unit,
an adapter cable is required.

Adapter cable
Cat. No. 22 1000 31 66 00



- ① Call diagnostic fault code
- ② Clear the stored faults
- ③ Clear the stored faults
- ④ Back, faults F5 - F1
- ⑤ Forwards, faults F1 - F5
- ⑥ Display with error message

The electronic control unit can store up to 5 faults, which can be read out and displayed with the timer.
The current error is shown as "AF" and is always written to memory location F1. Previous faults are transferred to memory locations F2 - F5; if necessary, the content of memory location F5 is overwritten.

Connect diagnostic unit

Detach the *HYDRONIC* cable harness.

Connect the diagnostic unit to the adapter cable at the cable harness, as shown in the diagram.

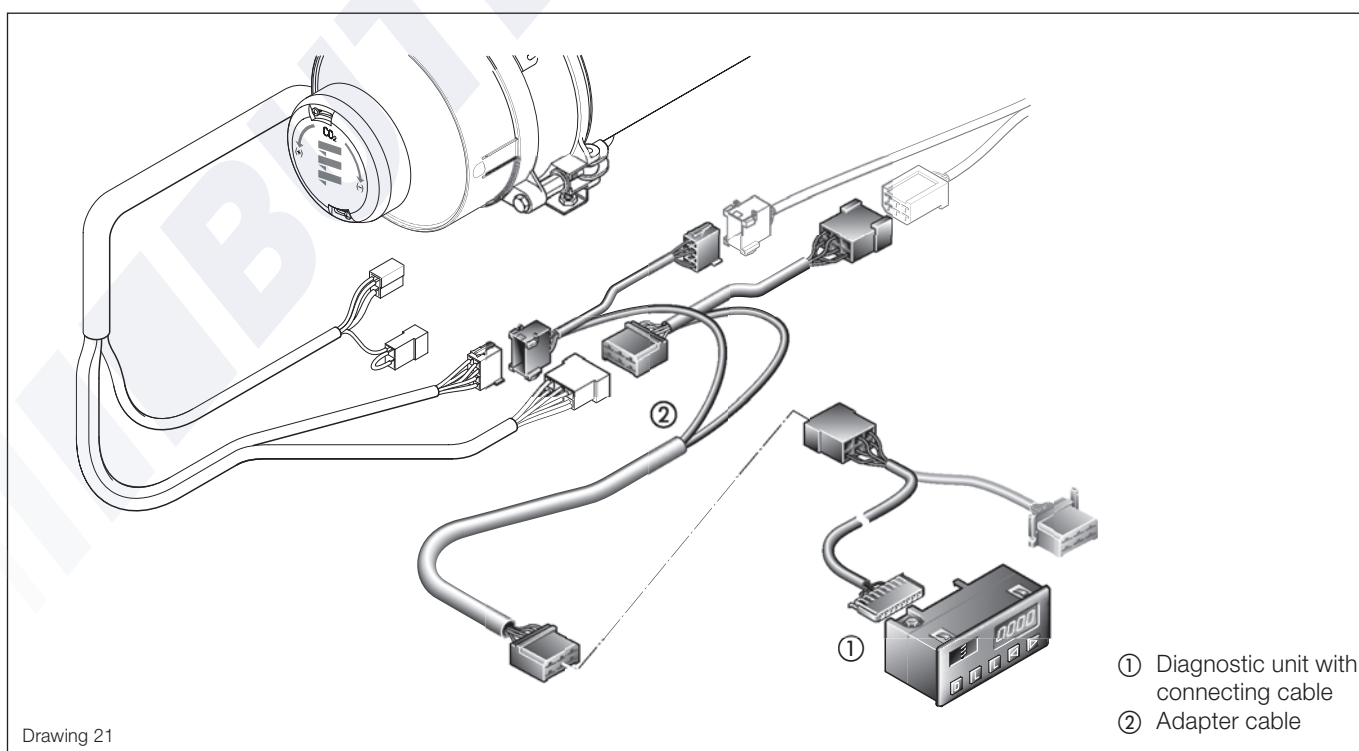
Retrieve fault memories F1 to F5

- Switch on the *HYDRONIC* at the control element.
- Press **[D]** key on the diagnostic unit.
Display readout:
AF = current fault
3-digit number = fault code
- Press the **[L]** key once to display F1, twice for F2 etc.

The fault code, description of the fault and comments / remedial measures are described on pages 30 to page 33.

Cancel control unit locking and simultaneously clear fault memory

- Press the two **[L]** keys a minimum of 2 seconds simultaneously ---> the control unit is unlocked and the stored faults F1 to F5 are cleared.



- ① Diagnostic unit with connecting cable
- ② Adapter cable

Drawing 21

4 / Troubleshooting

Fault diagnosis with the ISO adapter and the KD 2000 software

ISO adapter and KD-2000 software
Cat. No. 22 1524 89 00 00

To connect the ISO adapter, an adapter cable is required.

Adapter cable
Cat. No. 22 1000 31 66 00

The electronic control unit can store up to 5 faults.
The faults can be read out and displayed with the ISO adapter and the KD 2000 software.
In heaters up to factory no. 12000, faults 1-5 are displayed.
With heaters from factory no. 12001, measured data is shown in addition to faults 1-5.

Connect ISO adapter

- Detach the *HYDRONIC* cable harness.
- Connect the adapter cable to the cable harness, as shown in the diagram
- Connect the adapter cable to the ISO adapter.
- Connect the SUB-D connecting cable with the PC and the ISO adapter.

Please note!

It is essential that the correct installation sequence is followed.

Installing KD 2000 software on the PC

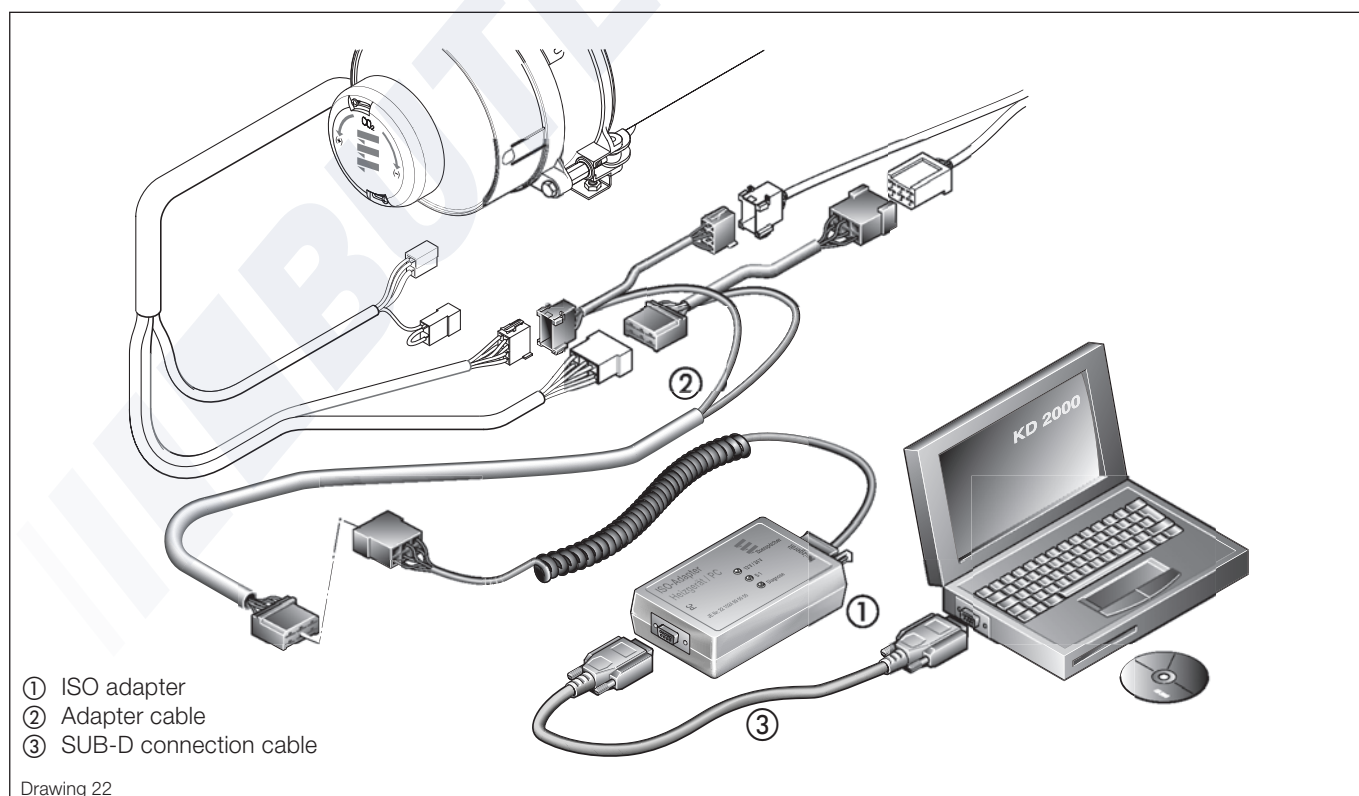
- Place CD-ROM in the CD drive.
- Double click on the file "setup.exe" and follow the instructions of the SETUP program.

Query / clear fault memories F1-F5 and / or cancel control unit locking

- On the PC, start the KD 2000 software
 - On the desktop, double-click on the "KD 2000" icon
 - Select heater type
 - Press "GO" button
- Clear fault memories and / or cancel control unit locking
 - Click on "Clear fault memory" button
 - > the stored faults F1-F5 are cleared and the control unit is unlocked.

Diagnosis complete

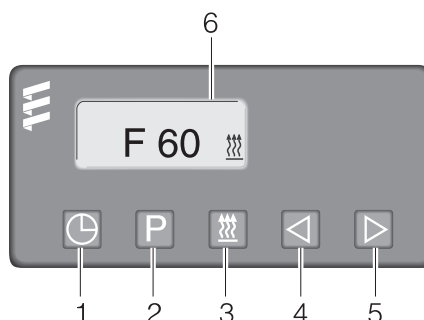
- Press "STOP" button --> interrogation of fault memory is terminated.



4 / Troubleshooting

Fault diagnosis with the modular timer

Modular timer
Cat. No. 22 1000 30 34 00



- ① Clock time
- ② Area code
- ③ Heat
- ④ Back
- ⑤ Forwards
- ⑥ Display with error message

The electronic control unit can store up to 5 faults, which can be read out and displayed with the timer.

The current error is shown as "AF" and is always written to memory location F1.

Previous faults are transferred to memory locations F2 - F5; if necessary, the content of memory location F5 is overwritten.

Retrieve fault memories F1 to F5

- Press key ---> HYDRONIC is switched on.
- Press key and keep held down, then within 2 sec. press key .
Display readout:
AF = current fault
3-digit number = fault code
- Press the > key once to display F1, twice for F2 etc.

The fault code, description of the fault and comments / remedial measures are described on pages 30 to page 33.

Cancel control unit locking and simultaneously clear fault memory

Condition:

An electrical connection exists between Terminal 15 (ignition) and the timer, 12-pin connector, compartment 10.

- Press key .
Display readout:
The current fault F15, F16 or F50
- Press key and keep held down, then within 2 sec. press key .

The modular timer has now entered the "Interrogate fault memory" routine.

- Switch ignition off (terminal 15).
- Press key and key simultaneously; in addition, switch the ignition on (terminal 15) and wait until the following appears in the display:

Display readout following ignition "ON":



Display flashes,
Heater symbol does not flash

- Switch HYDRONIC off and on --> the control unit is unlocked, the HYDRONIC starts up again.

Information shown after switching off and on, and new interrogation of fault memory:






Display flashes
Heater symbol does not flash

4 / Troubleshooting

Fault code Fault Description	Cause • Remedial measures
000 No fault	-----
010 Overvoltage --> disconnection	<p>Overvoltage (>30 V) exists for a minimum of 20 seconds without interruption at the control unit - <i>HYDRONIC</i> not working.</p> <ul style="list-style-type: none">• Unplug 18-pin connector on the control unit and start up vehicle engine. Measure the voltage between PIN 15 (red 2.5 mm² cable) and PIN 16 (brown 2.5 mm² cable) if the voltage >30 V --> check alternator controller.
011 Undervoltage --> disconnection	<p>Undervoltage (<19 V) exists for a minimum of 20 seconds without interruption at the control unit - <i>HYDRONIC</i> not working.</p> <ul style="list-style-type: none">• Pull out the 18-pin connector on the control unit, start up the vehicle engine, measure the voltage between PIN 15 (red 2.5 mm² cable) and PIN 16 (brown 2.5 mm² cable). The measured value and the voltage at the battery should not deviate. In the event of a voltage drop, check the fuses, the supply lines, the chassis earth connections and the positive terminal connection point of the battery for correct contact
012 Overheating	<p>Safety thermal cutout sensor temperature >130°C</p> <ul style="list-style-type: none">• Check water circulation system:<ul style="list-style-type: none">- Check all hose connections for leaks- Bleed water circulation system- Check valves in water circulation system and, if necessary, replace- Temperature difference between water inlet and water outlet must <10 K; if not, --> check minimum throughput of the heating medium, see values in the Technical Data.• Check water pump and if necessary replace• Check safety thermal cutout sensor and if necessary replace (see diagram on page 45)
014 Temperature difference between temperature sensor and safety thermal cutout sensor too big	<p>Difference between measured values of temperature sensor and safety thermal cut-out sensor above permitted limits for an extended period.</p> <ul style="list-style-type: none">• Check mounting of both sensors, if necessary, tighten up sensors, tightening torque on both sensors 2.5 +0.5 Nm.• Check temperature sensors and safety thermal cutout sensor (see diagrams, pages 44 and 45).• Check minimum throughput of the heating medium. See values in the Technical Data.
015 Operation disable - control unit is locked	<p>Fault code 012 "Overheating" has been displayed three times in succession --> fault code 015 displayed.</p> <p>Control unit unlocked by clearing the fault memory (see pages 26 to 29).</p> <ul style="list-style-type: none">• For remedial measures, see fault code 012.
016 Operation disable - control unit is locked	<p>Fault code 058 "Flame during delayed shutoff" has been displayed three times in succession --> fault code 016 displayed.</p> <p>Control unit unlocked by clearing the fault memory (see pages 26 to 29).</p> <ul style="list-style-type: none">• For remedial measures, see fault code 058.



4 / Troubleshooting

Fault code	Cause
Fault Description	• Remedial measures
020 Ignition spark generator - open circuit	Control line from ignition spark generator to the control unit has open circuit or short circuit. <ul style="list-style-type: none">• Check cable section from the ignition spark generator to the control unit and, if necessary, eliminate open circuit or short circuit.• Check functioning of the ignition spark generator only with the test unit for burner head; if necessary, replace the ignition spark generator.• If the fault could not be eliminated by taking the remedial measures listed above, --> replace control unit.
 High voltage	
021 Ignition spark generator - ground leakage	Control line from the ignition spark generator to the control unit has ground leakage. <ul style="list-style-type: none">• Check cable section from the ignition spark generator to the control unit and, if necessary, eliminate ground leakage.• Check functioning of the ignition spark generator only with the test unit for burner head; if necessary, replace the ignition spark generator.• If the fault could not be resolved by taking the remedial measures listed above, --> replace control unit.
 High voltage	
025 Diagnostic output - short circuit	Blue / white 1 mm ² cable from the 18-pin control unit connector, compartment 12 to the 8-pin cable harness connector, compartment 2 has short-circuit against +U _B . <ul style="list-style-type: none">• Check lead and connections and, if necessary, eliminate short circuit.
032 Burner motor does not turn - on start-up 033 Burner motor does not turn - during operation	Fan wheel is chafing or is blocked. Burner motor faulty. Generator voltage too low. <ul style="list-style-type: none">• Check that fan wheel is running freely.• Check lines and connections to the burner motor.• Check functioning of the installed burner motor only with the test unit for burner head; if necessary, replace the burner motor.• If the fault could not be eliminated by taking the remedial measures listed above, --> replace control unit.
 Apply max. 12 V at burner motor	Fuel pump is blocked. <ul style="list-style-type: none">• Check that fuel pump is running freely. If necessary, replace the burner.
037 Water pump - fault	Check in advance: <ul style="list-style-type: none">• Is Bus 2000 water pump installed?• Is Bus 2000 water pump cable section "Diagnosis" connected?• Does the Bus 2000 water pump have any power?<ul style="list-style-type: none">If yes<ul style="list-style-type: none">- detach plug connection from the "Diagnosis" cable section. <i>Start HYDRONIC</i> - if fault code 037 is no longer displayed, then check the Bus 2000 water pump for dry running and / or for blockages.- If fault code 037 continues to be displayed, then apply the remedial measures described for the water pump (standard model).• Water pump (normal model) is installed?<ul style="list-style-type: none">If yes<ul style="list-style-type: none">- detach plug connection from the "Water pump" cable section, apply power to the 2-pin connector on the "Water pump" cable section and check for correct functioning. If the water pump is functioning OK, then check fuse (15A), cable section and water pump connections --> if fault code 037 continues to be displayed, then replace the control unit.

4 / Troubleshooting

Fault code Fault Description	Cause • Remedial measures
039 Vehicle blower control - short circuit	<p>Black 1 mm² cable from the 18-pin control unit connector, compartment 6 to the 8-pin cable harness connector, compartment 7, and from there to the blower relay has short-circuit.</p> <ul style="list-style-type: none"> • Check lead and connections and, if necessary, eliminate short circuit. • Check mounting of the relay. • Replace relay. • If the fault could not be eliminated by taking the remedial measures listed above, then replace control unit.
044 Water pump - relay coil open circuit 045 Water pump - relay coil short circuit	<ul style="list-style-type: none"> • Check mounting of the relay on the control unit. • Replace relay. • If the fault could not be eliminated by taking the remedial measures listed above, then replace control unit.
046 Solenoid valve - open circuit	<p>"Solenoid valve" cable section from the control unit (connector position "D") to the solenoid valve has open circuit or ground leakage.</p> <ul style="list-style-type: none"> • Check leads and connections to solenoid valve, if necessary eliminate ground leakage. • Replace solenoid valve coil. • If the fault could not be eliminated by taking the remedial measures listed above, then replace control unit.
047 Solenoid valve - short circuit	<p>"Solenoid valve" cable section from the control unit (connector position "D") to the solenoid valve has short-circuit.</p> <ul style="list-style-type: none"> • Check leads and connections to solenoid valve, if necessary eliminate short circuit. • Replace solenoid valve coil. • If the fault could not be eliminated by taking the remedial measures listed above, then replace control unit.
048 Nozzle holder heater - relay coil open circuit 049 Nozzle holder heater - relay coil short circuit	<ul style="list-style-type: none"> • Check mounting of the relay on the control unit. • Replace relay.
050 Operation disable - control unit is locked	<p>The control unit remains locked through 10 attempts at start-up without flame detection.</p> <p>Control unit unlocked by clearing the fault memory with modular timer, diagnostic unit or KD 2000 (see pages 26 to 29).</p> <ul style="list-style-type: none"> • For remedial measures, see fault code 052.
051 Flame monitor reports "Flamme vor Brennstoff" [Flame without fuel]	<ul style="list-style-type: none"> • Replace burner.
052 No start or safety time overshoot	<p>No flame was detected within the ignition phase.</p> <ul style="list-style-type: none"> • Check combustion air inlet and exhaust gas piping. • Check fuel supply (supply and return). • Check flame pipe to make sure it is correctly mounted in the heat exchanger. • Check functioning of the ignition spark generator only with the test unit for burner head; if necessary, replace the ignition spark generator. • Check ignition electrode, adjust and, if necessary, replace. • Check electric leads and connections. • Check flame monitor for dirt accumulation and, if necessary, clean. • Replace fuel atomizer nozzle. • If the fault could not be eliminated by taking the remedial measures listed above, then replace control unit.



High voltage
Take care when checking the
ignition spark generator!

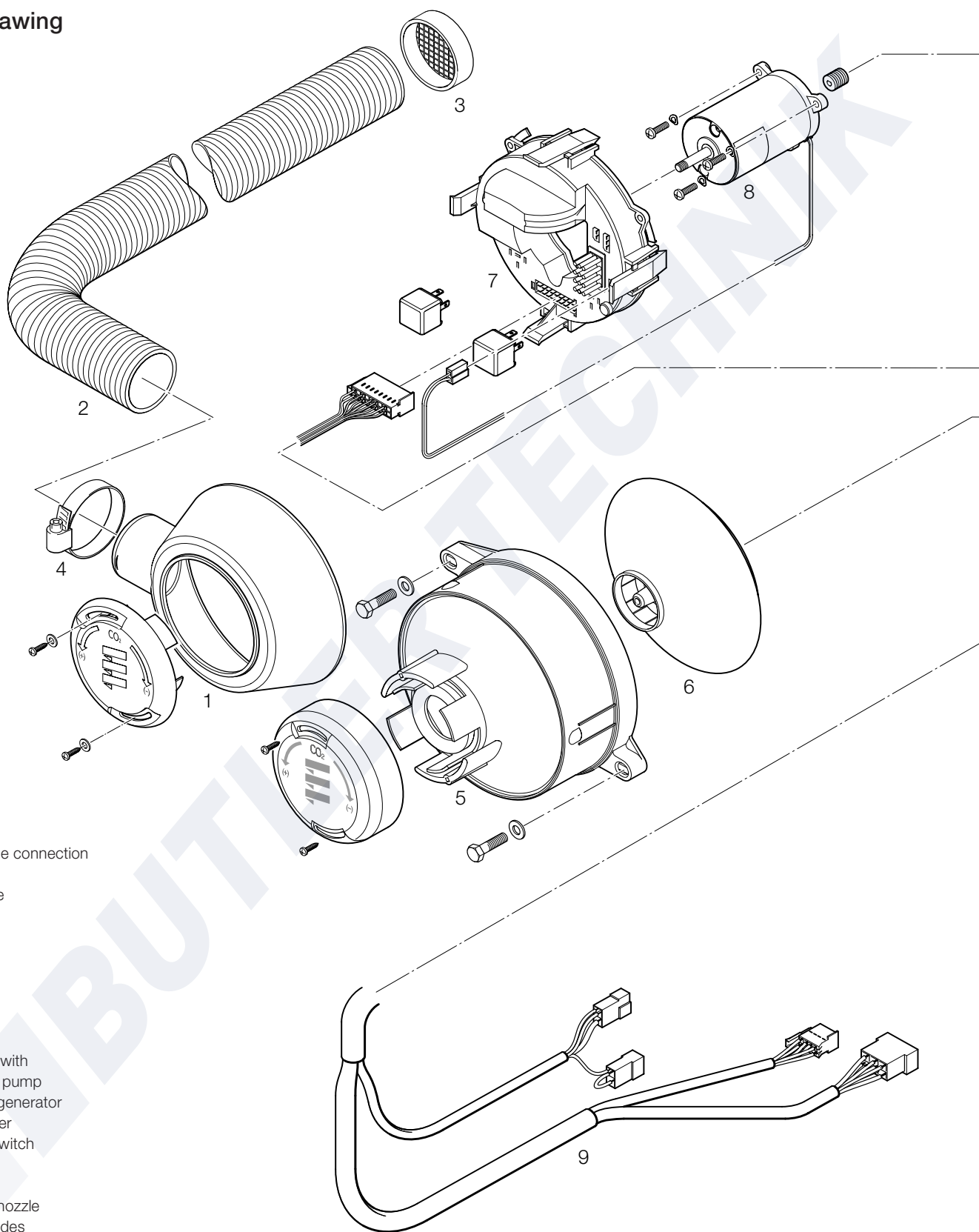


4 / Troubleshooting

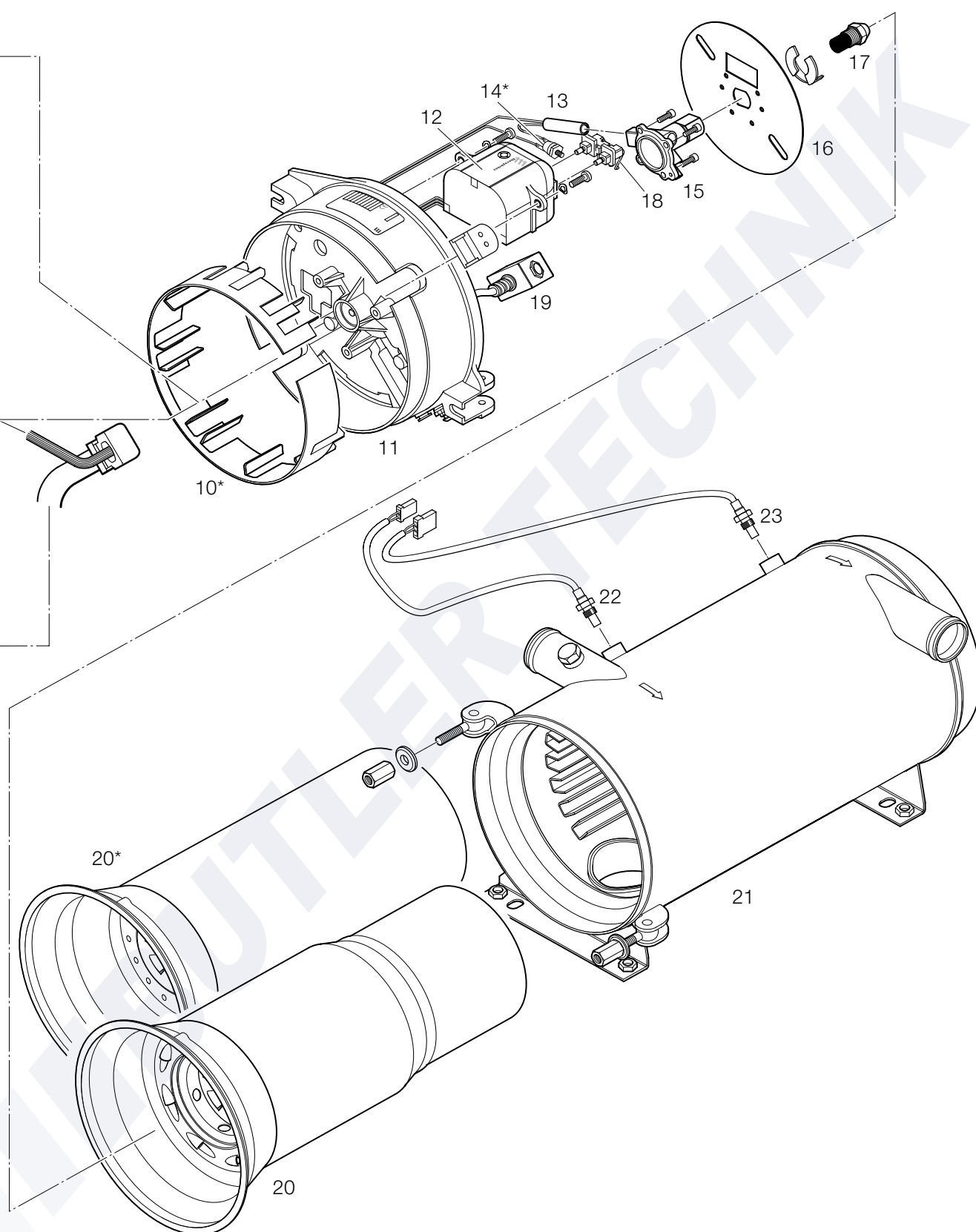
Fault code Fault Description	Cause • Remedial measures
054 Flame loss during operation	<i>HYDRONIC</i> has ignited, detected the flame and reports flame loss twice within an operating period of 60 minutes. <ul style="list-style-type: none">• Check fuel supply (supply and return).• Measure the amount of CO₂.• Replace fuel atomizer nozzle.• If the fault could not be eliminated by taking the remedial measures listed above, then replace control unit.
058 Flame not extinguished during delayed shutoff	Flame monitor reports 30 seconds after delayed shutoff "ON" that the flame has not gone out. <ul style="list-style-type: none">• Check heat exchanger and clean as necessary, then measure the amount of CO₂.• Check solenoid valve with the test unit for burner head and, if necessary, replace.• If fuel continues to be delivered during the delayed shutoff --> replace fuel pump.• If the fault could not be eliminated by taking the remedial measures listed above, then replace control unit.
060 Temperature sensor - open circuit 061 Temperature sensor - short circuit	Temperature outside operating range. <ul style="list-style-type: none">• Check plug connection for temperature sensor and line to the control unit.• Check temperature sensor (see diagram on page 44).• If the fault could not be eliminated by taking the remedial measures listed above, then replace control unit.
071 Safety thermal cutout sensor - open circuit 072 Safety thermal cutout sensor - short circuit	Temperature outside operating range. <ul style="list-style-type: none">• Check plug connection for safety thermal cutout sensor and line to the control unit.• Check safety thermal cutout sensor (see diagram on page 45).• If the fault could not be eliminated by taking the remedial measures listed above, then replace control unit.
081 Combustion indicator light - short circuit	Yellow/white 1 mm ² cable from the 18-pin control unit connector, compartment 8 to the 8-pin cable harness connector, compartment 3, and from there to the combustion indicator light has short-circuit. <ul style="list-style-type: none">• Check lead and connections and, if necessary, eliminate short circuit.• Check combustion indicator light and, if necessary, replace.
083 Fault indicator light - short circuit	Green 1 mm ² cable from the 18-pin control unit connector, compartment 5 to the 8-pin cable harness connector, compartment 6, and from there to the fault indicator light has short-circuit. <ul style="list-style-type: none">• Check lead and connections and, if necessary, eliminate short circuit.• Check fault indicator light and, if necessary, replace.
090, 092 Control unit faulty 093, 094 097	<ul style="list-style-type: none">• Replace control unit.
091 External interference voltage	Possible causes: <ul style="list-style-type: none">• Incorrect setting of the ignition electrodes - adjust ignition electrodes. Remove battery charger or other source of interference voltage.• If the fault could not be eliminated by taking the remedial measures listed above, then replace control unit.

5 / Repair Instructions

Assembly drawing



Drawing 23



* Only with heater models
 HYDRONIC 16 - 25 2165 01 00 00
 HYDRONIC 24 - 25 1817 01 00 00

5 / Repair Instructions

Repair Instructions

The "Repair Instructions" chapter describes the approved repair work for the *HYDRONIC* 16 / 24 / 30 / 35.

Where extensive repair work is to be carried out, it is sensible to dismantle the *HYDRONIC*.

Mounting of the *HYDRONIC* involves the reverse sequence of steps, but there may be some additional instructions which need to be heeded.

Once all work on the *HYDRONIC* has been completed, a functional test should be performed (see page 5).

Prior to working on the *HYDRONIC*, the following safety instructions should be noted:



Danger of injury, burning and poisoning!

- Always switch off the *HYDRONIC* and allow to cool before commencing work.
- Disconnect battery.
- Remove any excess pressure in the cooling system by opening the radiator cap.
- Do not switch on *HYDRONIC* with the burner dismantled.
- Prior to removing the ignition spark generator, detach the plug connections in the cable harness.
- The *HYDRONIC* must not be operated in enclosed spaces such as garages or workshops.
Exception:
Where existing exhaust gas extraction is directly at the exhaust pipe entrance.

Please note!

- Gaskets on dismantled components must be replaced.
- Where repair work is performed, examine all components for damage and, if necessary, replace.
- Examine plug contacts, plug connections and lines for corrosion and damage and, if necessary, repair.
- When a part needs to be replaced, only Eberspächer spare parts may be used.
- After working on the coolant circuit, the status of the coolant must be checked, and if necessary the coolant must be topped up in accordance with the vehicle manufacturer's specification.
The coolant circuit must then be bled.
- Operation or delayed shutoff of the *HYDRONIC* may only be terminated in an emergency (see "Emergency cutout - emergency circuit breaker" page 7) through disconnection of the battery (danger of *HYDRONIC* overheating).

5 / Repair Instructions

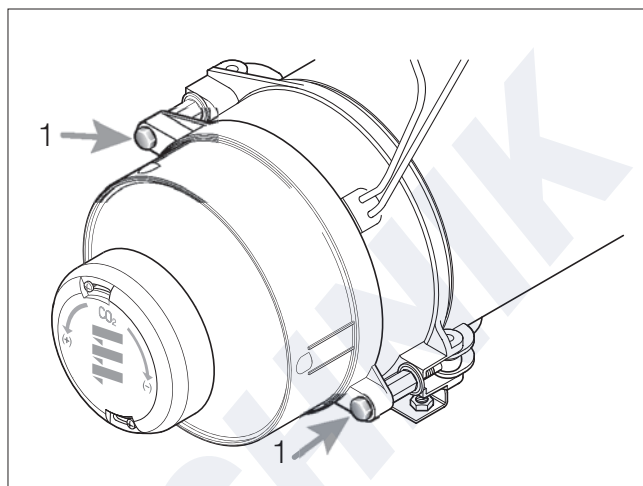
Removing the hood (see Drawing 24)

- Undo the two fixing screws on the hood.
- Take off the hood.

Beware danger of injury!

- The fan wheel has sharp edges.
 - Avoid contact with the fan wheel and, if necessary, wear protective gloves.

① Fixing screw



Drawing 24

Removing the burner (see Figure 1).

- Take off the hood.
- Pull out "Temperature sensor" and "Safety thermal cutout sensor" cable sections on the control unit.
- Take grommet out of burner casing.

Please note!

The fuel lines should remain connected. If necessary, lengthen the fuel lines.

- ① Burner
- ② Heat exchanger
- ③ Grommet
- ④ "Temperature sensor" and "Safety thermal cutout sensor" cable sections

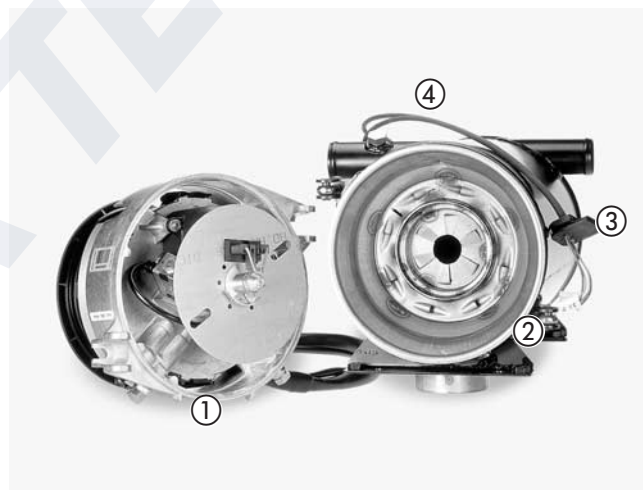


Figure 1

Remove control unit (see Figure 2)

- Take off the hood.
- Remove burner.
- Unscrew the fan wheel in an anti-clockwise direction, counter-restraining the motor shaft with screwdriver.
- Pull off connectors on the front and rear sides of the control unit.
- Unlock and remove control unit with the 4 clamps.

- ① Control unit
- ② Clamps
- ③ Motor shaft (threaded)

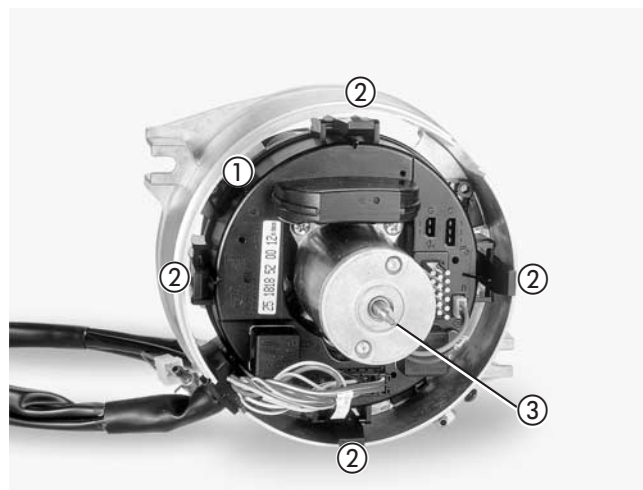


Figure 2

5 / Repair Instructions

Removing the burner motor (see Figures 3 and 4)

- Take off the hood.
- Unscrew the fan wheel in an anti-clockwise direction, counter-restraining the motor shaft with screwdriver.
- If necessary, check the burner motor with the test unit for burner head (see below).
- Pull out "Burner motor" cable section at the control unit, slot "B".
- Undo 3 fastening screws from the burner motor.
- Remove burner motor.

Please note!

When mounting the fan wheel, tighten with 1 Nm +0.5 Nm.



Figure 3

- ① Electric motor
- ② Fixing screws
- ③ Motor shaft (threaded)



Figure 4

- ① Figure 4
- ② Coupling

Checking functioning and rpm of the burner motor with the test unit for burner head (see Diagram 25)

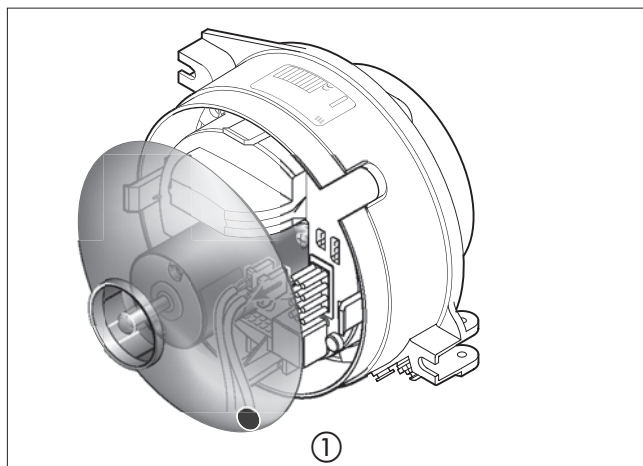
- Remove all connectors from the control unit.
- Connect test unit for burner head.
- Mark the fan wheel.
- Hold down the "Heizung EIN" ["Heating ON"] switch for 4 seconds ---> the *HYDRONIC* starts, the electric motor must run for 180 seconds (delayed shutoff) --->
 - If it does, measure the rpm with a contactless speed measuring unit.
 - If not, replace the electric motor.

Electric motor rpm

<i>HYDRONIC</i> 16	3800 ±350 rpm
<i>HYDRONIC</i> 24	4200 ±350 rpm
<i>HYDRONIC</i> 30	4800 ±350 rpm
<i>HYDRONIC</i> 35	5200 ±350 rpm

Beware danger of injury!

- The fan wheel has sharp edges.
 - Avoid contact with the fan wheel and, if necessary, wear protective gloves.



Drawing 25

- ① Fan wheel with marking

Please note!

Please observe the operating instructions for the test unit for burner head. Wait for the electric motor to run for 180 seconds.

5 / Repair Instructions

Removing the ignition electrodes

(see Figure 5 and Drawing 26)

- Take off the hood.
- Remove burner.
- Remove ignition electrodes from ignition spark generator.

Following installation, check the position of the ignition electrodes and adjust as necessary.

- Attach the reference gauge to the nozzle and push as far as the limit stop.
- Check the electrode position. The points of the electrodes should be touching the square-shaped surfaces of the reference gauge. If necessary, carefully bend the electrode points until they are touching the square surfaces of the reference gauge.

Please note!

- The insulation of the ignition electrodes must not be damaged.
- When measuring the distance between the electrodes do not touch the fuel atomizer nozzle opening.
- The reference gauge is enclosed with the spare parts.

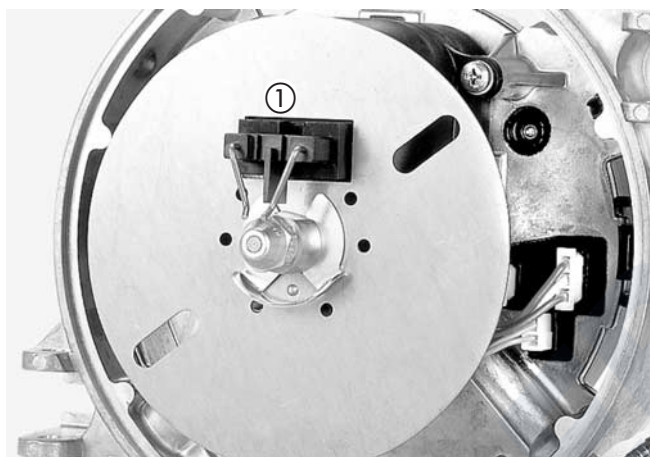
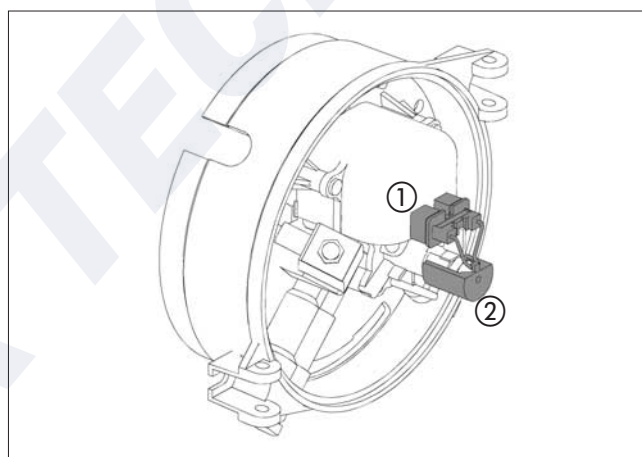


Figure 5

① Ignition electrodes



Drawing 26

① Ignition electrodes
② Reference gauge

Removing the fuel atomizer nozzle (see Figure 6)

- Take off the hood.
- Remove burner.
- Remove ignition electrodes.
- Unscrew fuel atomizer nozzle from the nozzle holder.

Please note!

- When installing the fuel atomizer nozzle, do not touch the nozzle opening.
- Following installation of the fuel atomizer nozzle, check the position of the ignition electrodes and adjust as necessary.
- Tightening torque for fuel atomizer nozzle 16 +1 Nm.



Figure 6

① Fuel atomizer nozzle ③ Baffle plate
② Ignition electrodes ④ Flame monitor

5 / Repair Instructions

Removing the ignition spark generator (see Figures 7-9)

- Take off the hood.
- Remove burner.
- Remove ignition electrodes.
- Remove securing clip (retaining spring) from the nozzle holder and take off the baffle plate.
- If necessary, check the ignition spark generator with the test unit for burner head (see below).
- Pull out "ignition spark generator" cable section at the control unit, slot "E".
- Undo the two fastening screws from the ignition spark generator.
- Remove ignition spark generator.

Please note!

- When installing, insert the ignition spark generator into the burner casing fixtures.
- Following installation, check the position of the ignition electrodes and adjust as necessary.
- Run the cable sections as shown in Figs. 8 and 9.

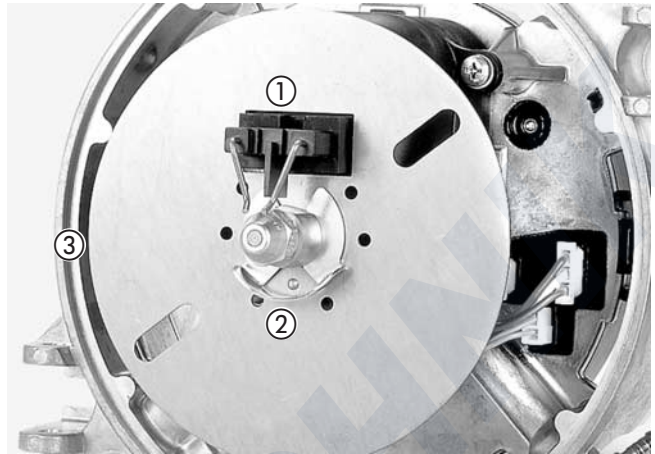


Figure 7

- ① Ignition electrodes
- ② Securing clip (retaining spring)
- ③ Baffle plate

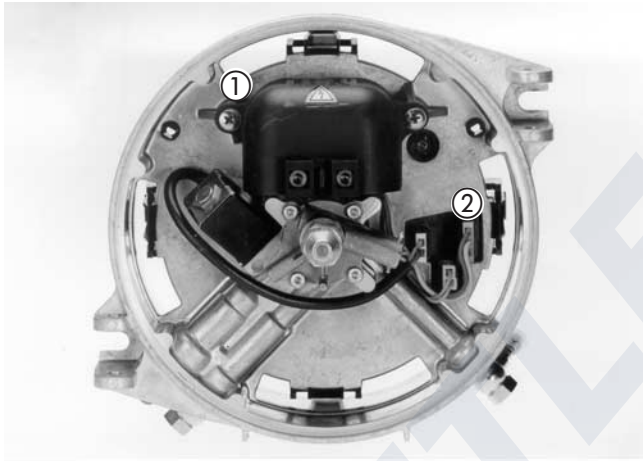


Figure 8

- ① Ignition spark generator
- ② Connection of the "Ignition spark generator" cable section to the control unit, slot "E"



Figure 9

- ① Ignition spark generator
- ② Fixtures for the ignition spark generator

Checking the ignition spark generator with the test unit for burner head

Danger!

- A spark gap with a voltage of approx. 20,000 V is formed between the electrodes.
 - Only check ignition spark generator with the test unit for burner head.
 - Do not check ignition spark generator without ignition electrodes.



High voltage

It is imperative to exercise caution when checking the ignition spark generator!

Functional test

- Remove all connectors from the control unit.
- Connect test unit for burner head.
- Press "ZFG" switch / button ---> a spark gap should form between the electrodes
 - If not, replace the electric motor.

5 / Repair Instructions

Removing the solenoid valve

(see Figure 10 and Drawing 26)

- Take off the hood.
- Remove burner.
- If necessary, check the solenoid valve with the test unit for burner head (see below).
- Pull out "Solenoid valve" cable section at the control unit, slot "D".
- Loosen hexagonal nut from the solenoid valve.
- Remove solenoid valve coil.
- Unscrew magnet.

Please note!

During installation of the heater, lay the cable sections as shown in Figure 10.

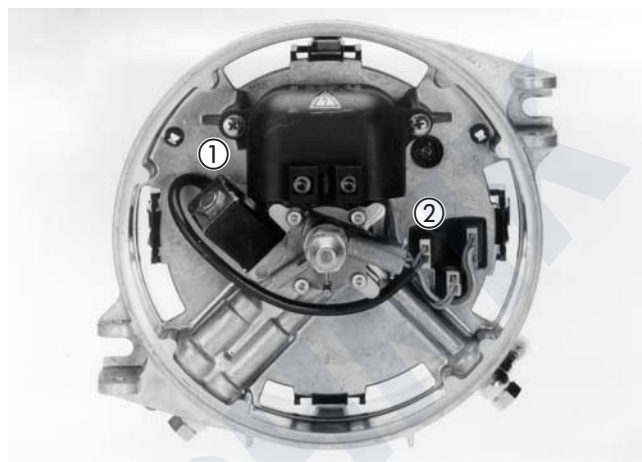
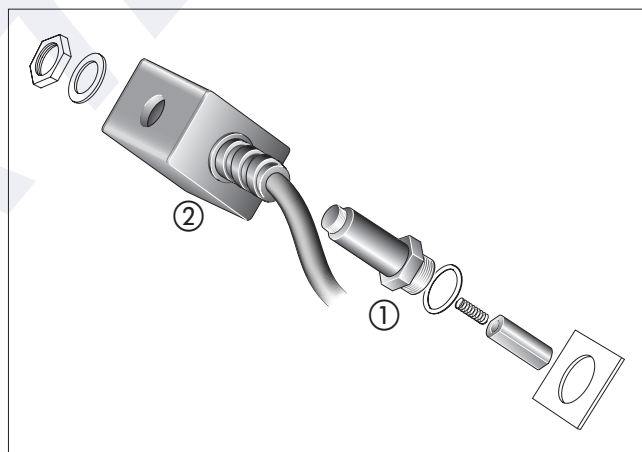


Figure 10

- ① Solenoid valve
- ② Connection of the "Solenoid valve" cable section to the control unit, slot "D"

Checking the solenoid valve with the test unit for burner head

- Remove all connectors from the control unit.
- Connect test unit for burner head.
- Press "MV" button ---> solenoid valve should click. If it does not, replace solenoid valve.



Drawing 26

- ① Magnet
- ② Solenoid valve coil

5 / Repair Instructions

Removing the heating cartridge for the nozzle holder heater (see Figures 11 and 12)

- Take off the hood.
- Remove burner.
- Remove ignition electrodes from ignition spark generator.
- Remove securing clip (retaining spring) from the nozzle holder.
- Remove baffle plate.
- Pull out "Heating cartridge" cable section at the control unit, slot "F".
- Remove securing pin from the nozzle holder (which holds the heating cartridge).
- Pull out heating cartridge from the nozzle holder.
- Unscrew temperature switch (if present) from the nozzle holder.
- If appropriate, check the heating cartridge (see below).

Please note!

- When installing the heating cartridge, insert the securing pin into the nozzle holder again.
- Tightening torque for temperature switch 2.8 +1 Nm.

Functional testing of the heating cartridge

- Connect ohmmeter to the 2-pin receptacle housing and behind the temperature switch (if present). If the measured value is 5-10 Ω , then the heating cartridge is OK, otherwise replace the heating cartridge.

Heating cartridge without temperature switch

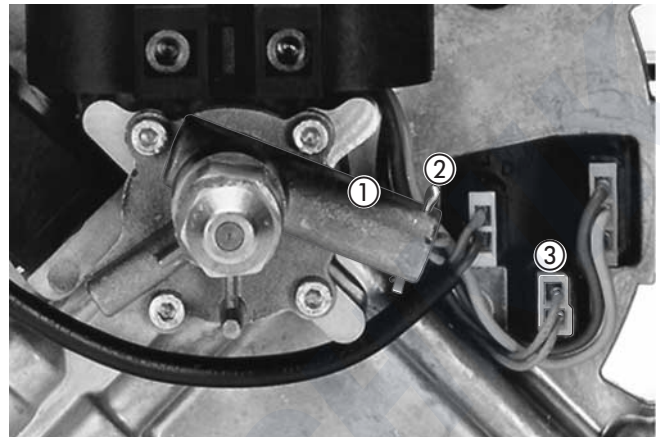


Figure 11

- ① Heating cartridge - installed in the nozzle holder
- ② Securing pin for heating cartridge
- ③ Connection of the "Heating cartridge" cable section to the control unit, slot "F"

Heating cartridge with temperature switch (only with HYDRONIC 24)

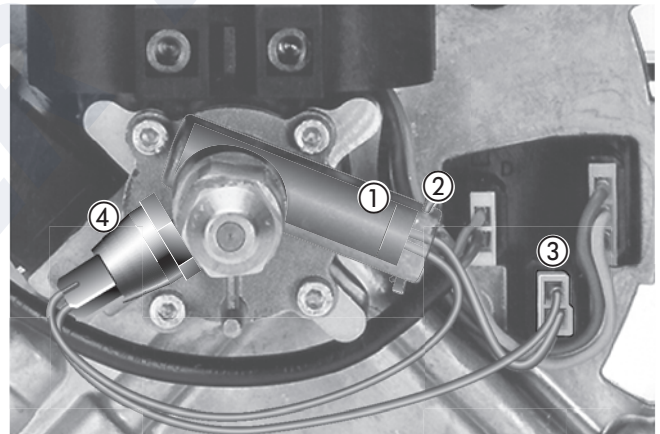


Figure 12

- ① Heating cartridge - installed in the nozzle holder
- ② Securing pin for heating cartridge
- ③ Connection of the "Heating cartridge" cable section to the control unit, slot "F"
- ④ Temperature switch

5 / Repair Instructions

Removing the flame pipe (see Figure 13 and Drawing 27)

- Take off the hood.
- Remove burner.
- Take flame pipe out of the heat exchanger.

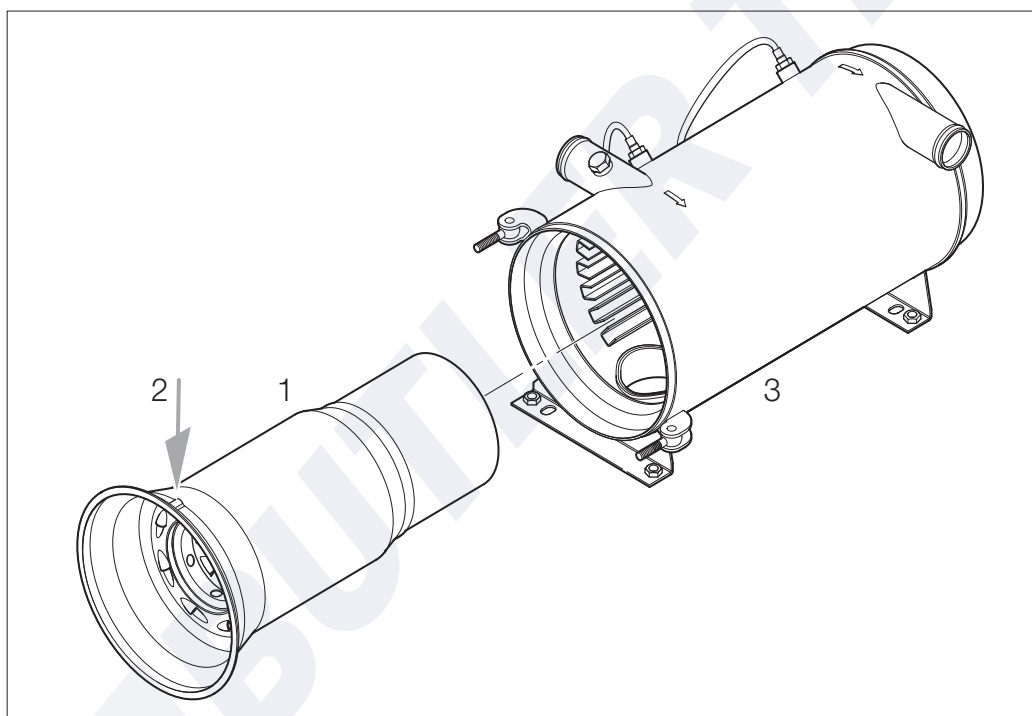
Please note!

During installation, insert the catch of the flame pipe into slot on the heat exchanger.



Figure 13

- ① Flame pipe
- ② Catch on the flame pipe
- ③ Heat exchanger



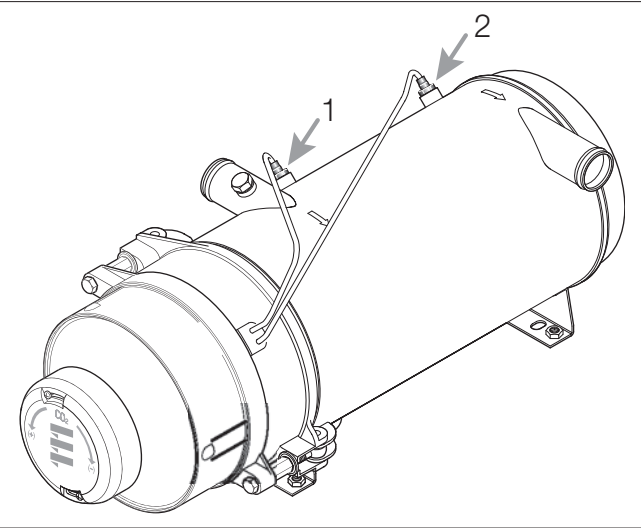
- ① Flame pipe
- ② Catch on the flame pipe
- ③ Heat exchanger

Drawing 27

5 / Repair Instructions

Removing the temperature sensor and safety thermal cutout sensor (see Figure 14 and Drawing 28)

- Take off the hood.
- Unscrew the fan wheel in an anti-clockwise direction, counter-restraining the motor shaft with screwdriver.



Drawing 28

- ① Temperature sensor
- ② Safety thermal cutout sensor

Impedances for temperature sensor and safety thermal cutout sensor (see Drawings 29 and 30)

Check the temperature sensor and the safety thermal cutout sensor using a digital multimeter and compare the values with the diagram and table of characteristic values. If the measured values do not agree with the diagram or table of characteristic values, then replace the temperature sensor or safety thermal cutout sensor.

Test for ground leakage:
There must be no electric connection between the sensor connections and the casing. Impedance must be ∞ .

Characteristic values - temperature sensor (PTC)

Temp. [°C]	Impedance [Ω]	Permitted deviation [$\pm\Omega$]
- 40	567	18
0	815	15
25	1000	12
40	1122	16
60	1299	23
80	1490	30
100	1696	44
120	1915	52
130	2023	62

- Remove plug connector from the temperature sensor / safety thermal cutout sensor on the control unit.
- Unscrew temperature sensor / safety thermal cutout sensor from the heat exchanger.

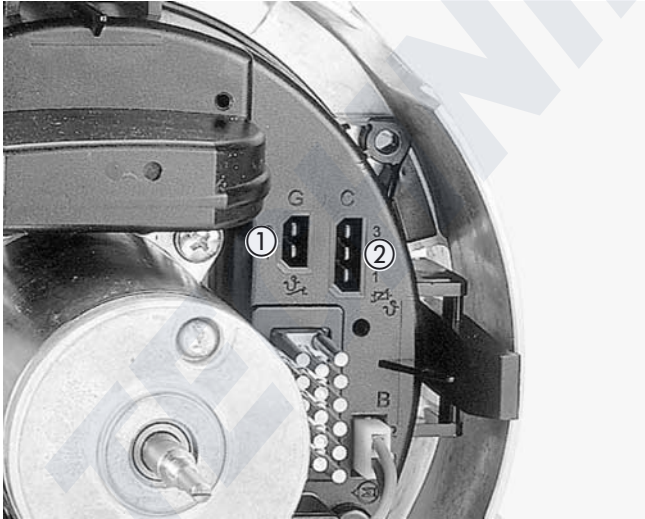
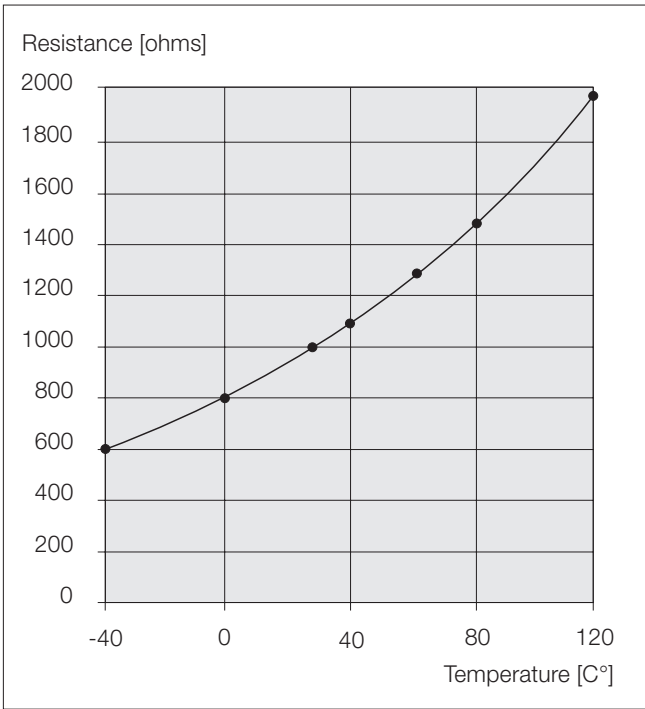


Figure 14

- ① Control unit, slot “G” for temperature sensor
- ② Control unit, slot “C” for safety thermal cutout sensor

Diagram - temperature sensor (excerpt)



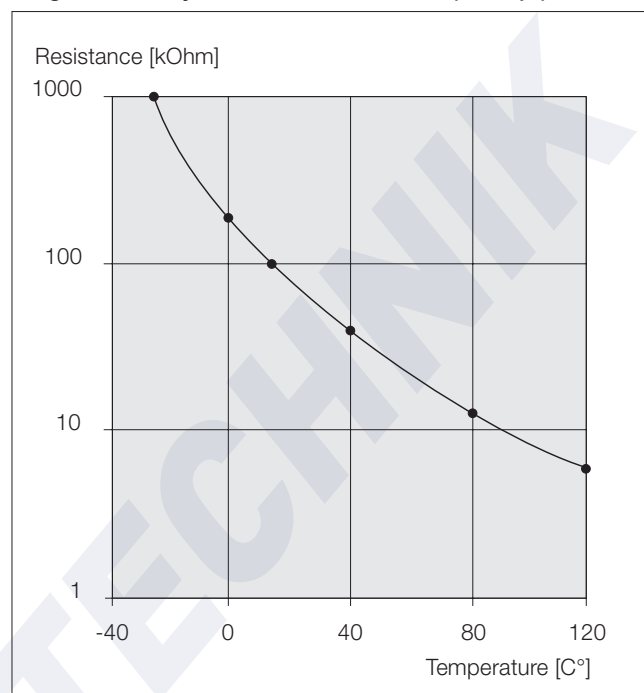
Drawing 29

5 / Repair Instructions

Characteristic value table - safety thermal cutout sensor (NTC)

Temp. [°C]	Impedance [Ω]	Permitted deviation [$\pm\Omega$]
- 40	3 492 000	324 600
0	337 933	21 560
25	103 517	5 000
40	55 143	3 130
60	25 950	1 727
80	13 118	995
100	7 099	597
120	4 069	374
130	3 135	300
150	1 917	199
180	981	115
200	668	85

Diagram - safety thermal cutout sensor (excerpt)



Drawing 30

Fuel supply

⚠ Danger of fire, explosions and poisoning!

- Exercise caution when handling fuel.
- Avoid naked flames while handling fuel.
- Do not smoke. This applies also where fuel can be detected only by its characteristic smell.
- Do not breathe in fuel vapour.
- When dismantling the fuel supply line, collect any fuel that comes out.

Removing the fuel strainer (see Figure 15)

- Take off the hood.
- Remove burner.
- Unscrew the hollow screw and the ring connection piece from the fuel supply line to the burner.
- Unscrew the fuel strainer from the burner casing, clean and, if necessary, replace.

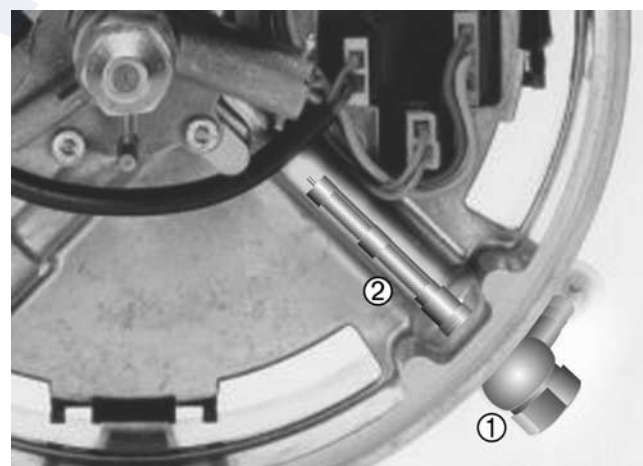


Figure 15

- ① Hollow screw and ring connection piece from the fuel supply line
- ② Fuel strainer

Please note!

Note regarding fuel quantity

It is not possible to accurately check the fuel quantity and pump pressure.
If necessary, the combustion can be checked by examining the CO₂ content in the exhaust gas.

If any change is necessary to the factory combustion air settings (CO₂ content), this can be effected by twisting the adjustment cap (see page 46).

5 / Repair Instructions

Measuring the CO₂ content in the exhaust gas



Danger of injury, fire and poisoning!

- The *HYDRONIC* must not be operated in enclosed spaces such as garages or workshops without exhaust-gas extraction.
- Do not switch on *HYDRONIC* with the burner dismantled.

Please note!

- Measurement of the CO₂ content and, if necessary, adjustment of the combustion air, is necessary:
 - after repairs to the *HYDRONIC* (functional test)
 - where combustion is not normal
 - after changing the fuel atomizer nozzle



Figure 16

① Adjustment cap

Measurement

Measurement of the CO₂ content of the *HYDRONIC* is carried out when the vehicle is running.

In order to be able to measure the CO₂ content accurately, the *HYDRONIC* must have reached its operating temperature.

Measure the CO₂ content using a CO₂ indicator, observing the manufacturer's data.

Adjusting the combustion air (see Figure 16)

- Unscrew the adjustment cap.
 - If the CO₂ content is less than 9 vol %, then turn the adjustment cap towards the left (CO₂ +).
 - If the CO₂ content is greater than 11 vol %, then turn the adjustment cap towards the right (CO₂ -).
- Secure the adjustment cap again.
- If it is not possible to adjust CO₂ content properly,
 - check burner for damage
 - check electric motor rpm
 - replace fuel atomizer nozzle.

5 / Repair Instructions

Taking the water pump apart (standard model)

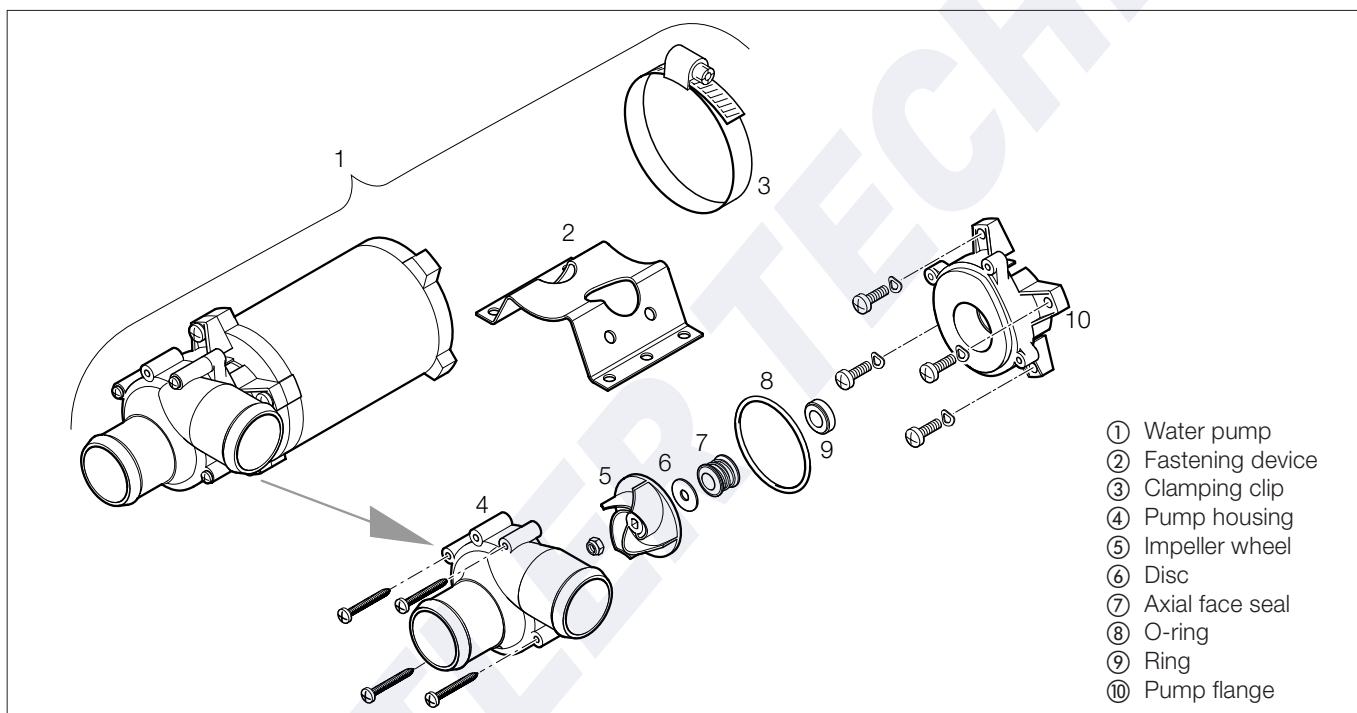
(see Drawing 31)

- Unscrew screws from the pump housing and take out the pump housing.
- Unscrew locknut and take out the impeller wheel.
- Remove axial face seal and ring from the motor shaft.
- Unscrew screws from the pump flange and take out the pump flange.
- Replace any faulty parts.

Please note!

- Clean axial face seal and ring with a dry cloth prior to installation.
- Slide surfaces must be free of grease and dust.
- Replace the O-ring.
- For spare parts numbers, see Spare Parts List.

Water pump - standard model



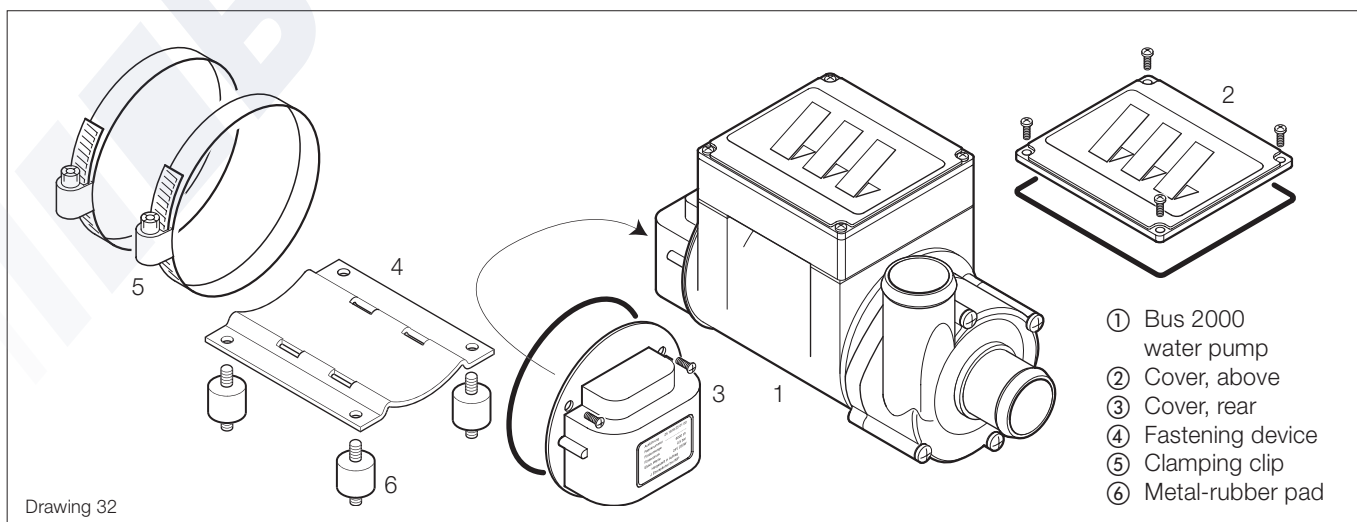
Drawing 31

Bus 2000 water pump (see Drawing 32)

The Bus 2000 water pump is maintenance-free. In case of damage, the entire water pump must be replaced.

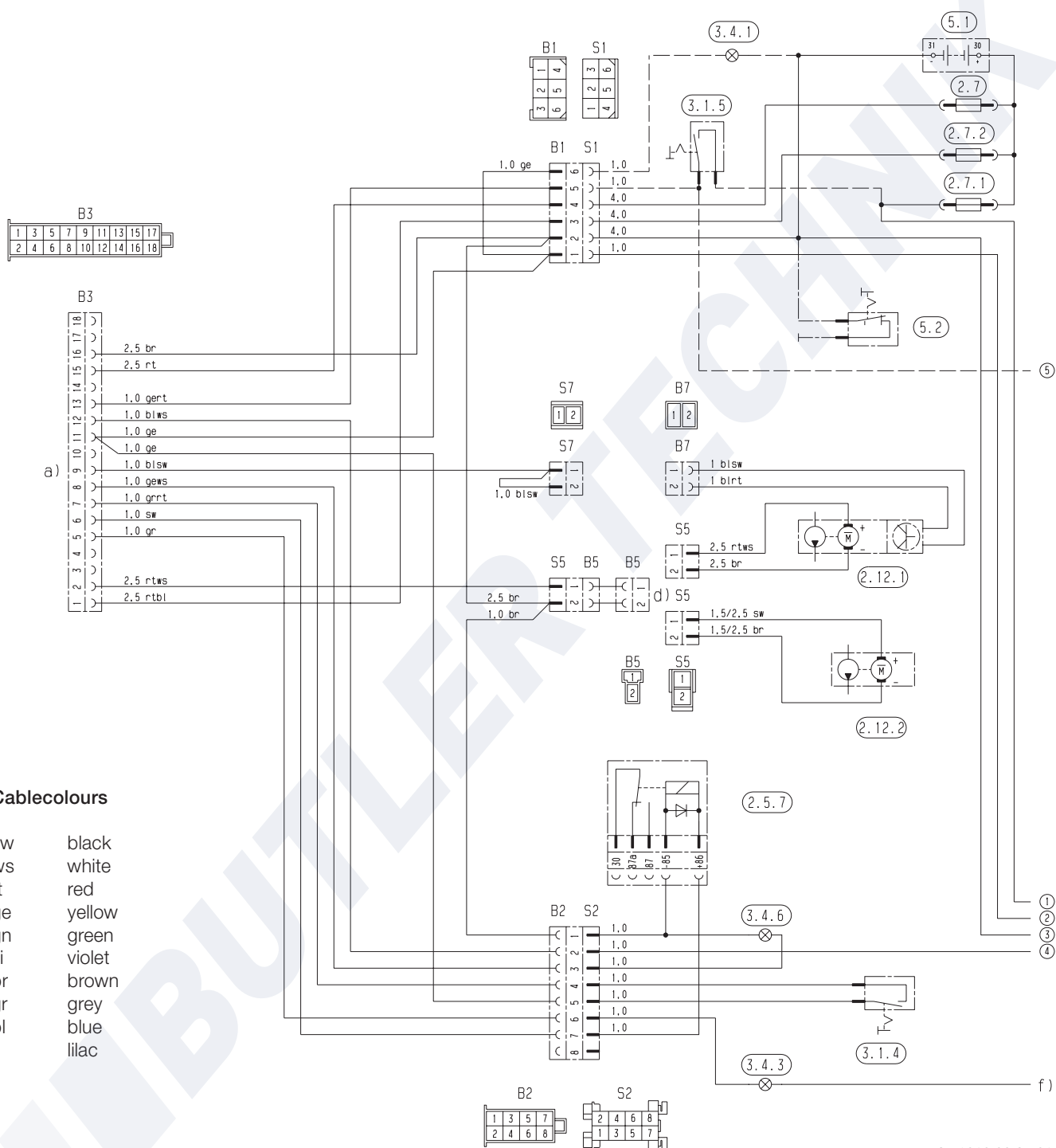
Please note!

For spare parts numbers of add-on components, see Spare Parts List.



Drawing 32

6 / Wiring diagram



25 1818 00 97 01 E

Cablecolours

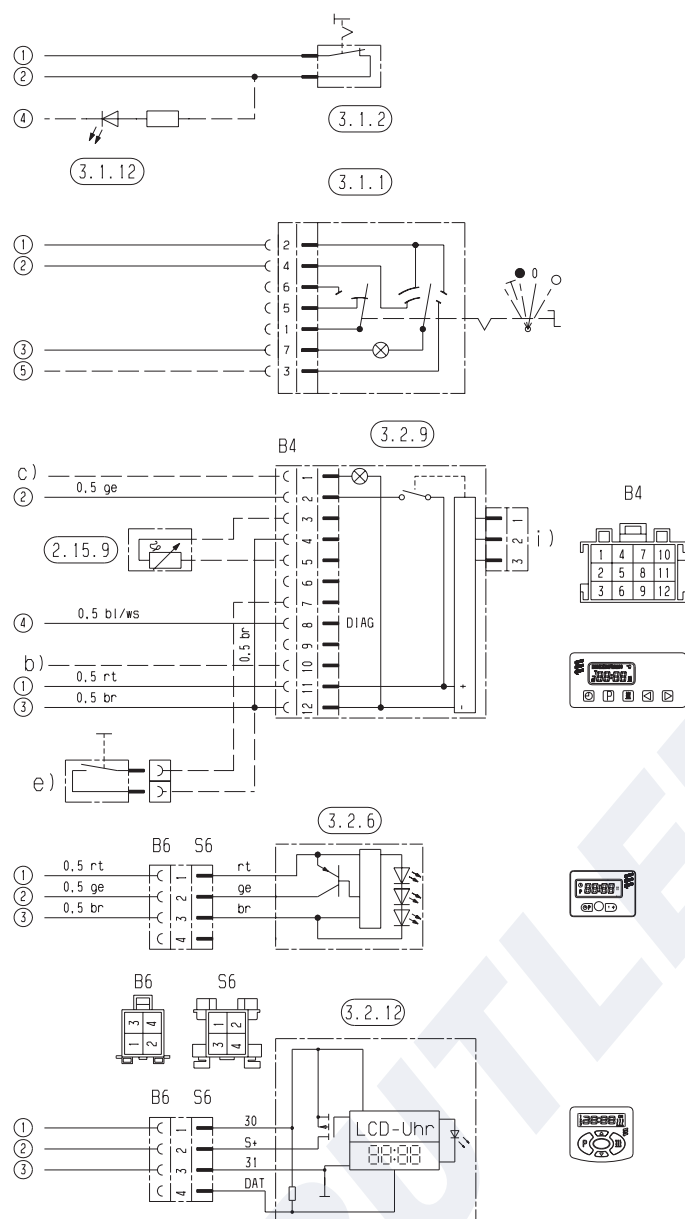
sw	black
ws	white
rt	red
ge	yellow
gn	green
vi	violet
br	brown
gr	grey
bl	blue
li	lilac

Parts list

2.5.7	Relay for control, e.g. of vehicle blower	3.1.4	Switch, temperature reduction	a)	HYDRONIC connection
2.7	Main fuse 15 A	3.1.5	Switch, water pump	d)	Either 2.12.1 or 2.12.2
2.7.1	5A fuse for control switch	3.4.1	Pilot light / flame indicator	f)	If 3.2.6 is used, optionally terminal 15 or terminal 30 - otherwise switch-on positive (yellow 1 mm ² line).
2.7.2	15A fuse for water pump	3.4.3	Fault code indicator		
2.12.1	Bus 2000 water pump	3.4.6	Combustion indicator light		
2.12.2	Water pump	5.1	Battery		
		5.2	Battery isolating switch		

6 / Wiring diagram

Wiring diagram, control elements



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Parts list

- | | | | |
|--------|------------------------------------|----|---------------------------------|
| 2.15.9 | Sensor, external temperature | b) | Connect to terminal +15 |
| 3.1.1 | Universal switch | c) | Illumination, terminal 58 |
| 3.1.2 | Switch, heat, continuous operation | e) | External ON/OFF key (optional) |
| 3.1.12 | Fault code inquiry | i) | Radio remote control connection |
| 3.2.6 | Mini-timer | | |
| 3.2.9 | Modular timer | | |
| 3.2.12 | Mini-timer (new) | | |

7 / Environment

Certification

The Eberspächer company accepts the challenge and takes active steps to avoid and eliminate ecological problems.

The *HYDRONIC* heater is designed for environmentally friendly operation.

ISO 9000 / ISO 14001

Our production process is certified to ISO 9000 (quality management) and ISO 14001 (environmental management).

QS 9000

In addition to ISO 9000, the Eberspächer company is certified to QS9000 (extended quality management for the American motor industry promoted by the manufacturers Ford, GM and Chrysler) and VDA 6.1 (extended quality management for the German motor industry).



EU declaration of conformity

It is hereby confirmed for the following products - heater, type

***HYDRONIC 16 / HYDRONIC 24
HYDRONIC 30 / HYDRONIC 35***

that the heater complies with the essential protection requirements laid down in Council Directive 89/336/EEC on the approximation of the laws of the member states relating to electromagnetic compatibility.

This declaration applies to all units which are manufactured in accordance with manufacturing drawings *HYDRONIC 16 / HYDRONIC 24, HYDRONIC 30 / HYDRONIC 35* - which are part of this declaration.

The following standards / directives have been used to assess the product with regard to its electromagnetic compatibility characteristics (EMC):

EN50081-1 Emissions
EN50082-1 Immunity
72/245/EEC - as amended by 95/54/EC on the electromagnetic interference produced by spark ignition engines

Disposal

Disposal of materials

Old heaters, faulty parts and packaging materials must be sorted by type so that, if required, all parts can be disposed of in an environmentally friendly fashion with recycling of materials where appropriate. In this connection, electric motors, control units and sensors (e.g. temperature sensors) count as "electrical scrap".

Heaters should be taken apart in accordance with the provisions of this manual relating to repairs.

Packaging

The heater packaging can be retained in case it needs to be sent back.

Regional offices - Germany

Postcode	Town	Company	Road	Telephone
17358	Torgelow	Eberspächer Heizgeräte GmbH	Wilhelmstraße 47	Tel. +49 (0)3976 23 50 - 0
20539	Hamburg	J. A. Schlüter Söhne Industrie-Vertriebs-GmbH	Ausschläger Bildeich 62-64	Tel. +49 (0)40 7 88 16 86
44139	Dortmund	Eugen Boss GmbH & Co. KG	Rosemeyerstr. 14	Tel. +49 (0)231 91 14 - 236
65936	Frankfurt	Dipl. Ing. B. Schmitt GmbH Technikhaus	Westerbachstr. 124	Tel. +49 (0)69 3 40 51 - 0
70327	Stuttgart	Fritz Trost GmbH & Co.	Kesselstr. 23	Tel. +49 (0)711 40 13 - 0
80807	Munich	MEINBURK Meineke GmbH	Ingolstädter Str. 43	Tel. +49 (0)89 3 50 33 - 0

Representative offices abroad

Country	Company	Town	Telephone
Argentina Chile Uruguay	Champion S.A. AGCO Argentina S.A	AR - 1603 Buenos Aires AR - 1603 Haedo	Tel. 01 - 709-02 24 Tel. 01 - 483 32 01
Belgium Luxemburg	Eberca b.v.b.a	B - 1930 Zaventem	Tel. 02 - 720 97 35 / 36
Denmark	Robert Bosch A / S	DK - 2750 Ballerup	Tel. 44 - 89 89 89
Estonia	Hesycy Group	EE - 72752 Järvamaa	Tel. 2 38 - 4 88 90
Finland France	Wihuri Oy Autola Eberspächer S. A. S.	SF - 01510 Vanta F - 93213 La Plaine St. Denis	Tel. 89 - 82 58 51 Tel. 01 - 49 17 52 00
Greece	Systems S. A.	GR - 18346 Moschato	Tel. 1 - 48 13 280
United Kingdom	Eberspächer UK Ltd.	GB - Hampshire BH 243 PB	Tel. 01425 - 48 01 51
Iceland	I. Erlingsson EHF	104 Reykjavik	Tel. 5 - 5 88 06 98
Italy	Ofi ra Italiana SPA.	I - 25 126 Brescia	Tel. 030 - 37 93 - 1
Canada	Espar Products Inc.	CDN - Mississauga Ontario L5T / 1Z8	Tel. 905 - 670 09 60
Latvia	Trans - Baltic Trading Corp.	LV - 1063 Riga	Tel. 2 - 26 63 23
Lithuania Netherlands	Tradcon Ltd. Eberca b.v.	LIT - 2055 Vilnius NL - 3261 LW Oud-Beijerland	Tel. 2 - 63 44 30 Tel. 01 86 - 62 19 55
Norway	Robert Bosch Norge A / S	N - 1411 Kolbotn	Tel. 66 - 81 70 00
Austria also Bulgaria, Croatia Republic of Yugoslavia, Romania, Slovakia, Slovenia, Hungary	Eberspächer Ges.m.b.H.	A - 1232 Vienna	Tel. 01 - 6 16 16 46 - 0



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Representative offices abroad

Country	Company	Town	Telephone
Poland	Eberspächer Sp.zo.	PL- 62081 Przemierowo	Tel. 061 - 81 6 18 50
Russia	Company OKMA	RUS - 105023 Moscow	Tel. 095 - 111 90 95
Sweden	Svenska Eberspächer AB	S - 12830 Skarpnäck	Tel. 0 8 - 683 11 00
Switzerland	Technomag AG	Ch - 4127 Birsfelden	Tel. 061 - 378 9152
Spain Portugal	Pedro Sanz Clima S. L	E - 28022 Madrid	Tel. 91 - 748 07 85
Czech Republic	Eberspächer spol. sr. o.	CZ - 15543 Prague 5	Tel. 02 - 652 05 48/49/50
Turkey	Konvekta Klima ve Sogutma Hosdere Mevkii	TR - 34860 Hadimköy - Istanbul	Tel. 0 21 26 23 20 80 - 85
Ukraine	Geruk 000	UA - 257008 Tscherkassy	Tel. 0472 - 63 87 47
USA	Espar Tech Center	Romulus, Michigan 48 174	Tel. 734 - 947 - 3900
Belarus	ZAO Belvneshinvest	BY. 220 113 Minsk	Tel. 172 - 317 294

List of Abbreviations

ABG

General Type Approval

ADR

European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR)

ADR99

Dangerous goods regulations in France

EMV

Electromagnetic compatibility

GGVS

Directive on the transport of dangerous goods by road (transport of dangerous goods by road, GGVS)

JE service partners

J. Eberspächer service partners

PME

Biodiesel that complies with DIN V 51606

StVZO

German regulations governing the registration of motor vehicles

TRS 003

Technical regulations relating to the transport of dangerous goods by road in conjunction with Annex B of the ADR

Please note!

- Installation of the *HYDRONIC* in vehicles that are used to transport dangerous goods within the provisions of GGVS / TRS 003, ADR / ADR99 is not permitted.

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